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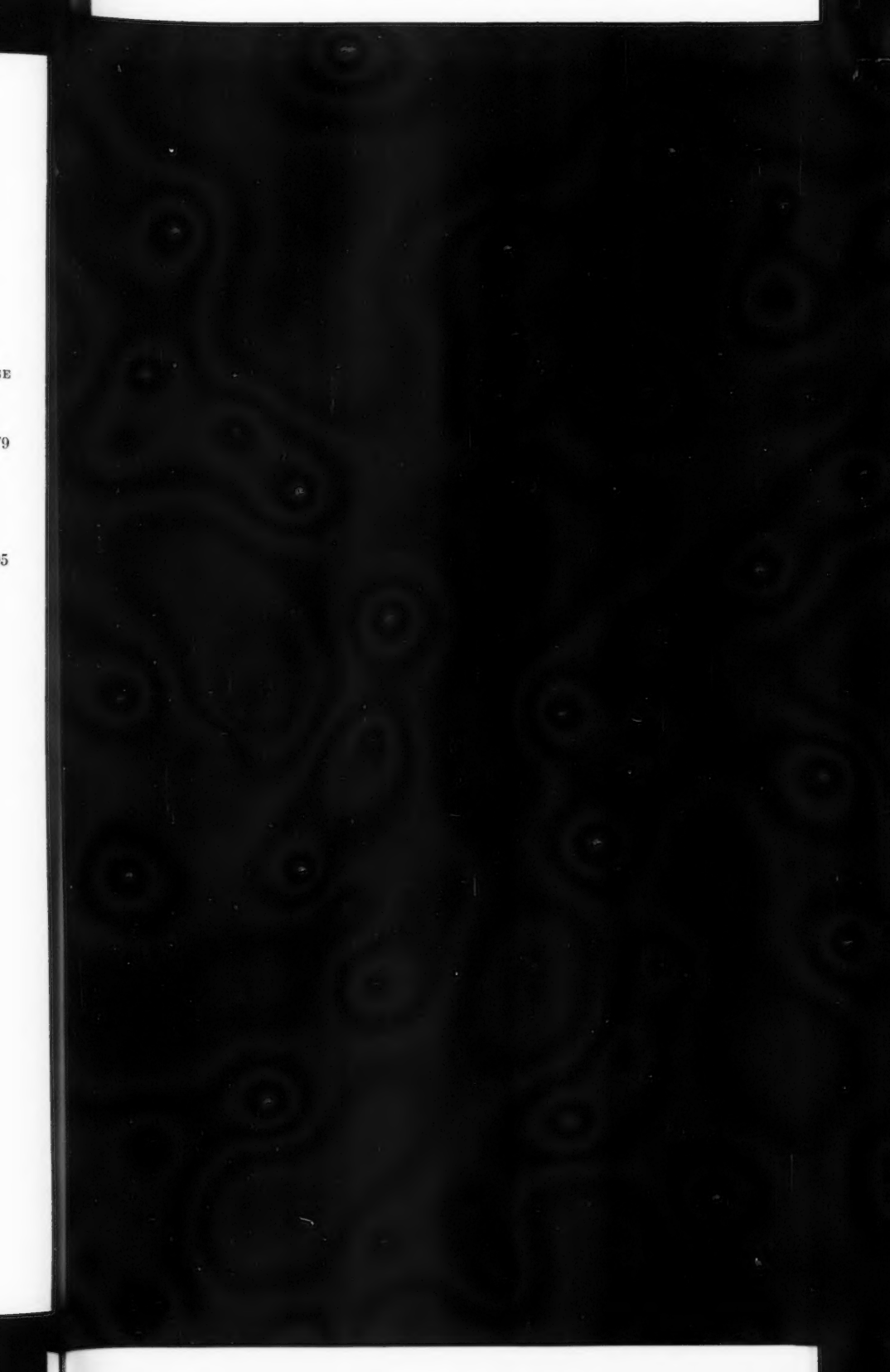


BIRD-BANDING

A JOURNAL OF ORNITHOLOGICAL INVESTIGATION

VOL. XI JULY, 1940 No. 3

THE PURPLE FINCH INVASION OF NORTHEASTERN UNITED STATES AND THE MARITIME PROVINCES IN 1939.

By RICHARD LEE WEAVER

INTRODUCTION

IN the winter and spring of 1939, January to May, an unusual invasion of Purple Finches (*Carpodacus purpureus purpureus*) occurred throughout the northeastern United States and the Maritime Provinces. Many bird banders were able to band their first Purple Finches, while many others saw or became aware of Purple Finches for the first time in their lives. Hundreds, and in many places thousands, of the birds congregated and fed on weed seeds and buds, or on grain supplied at many feeding stations. Sunflower seed was preferred to most other foods, and thousands of pounds of it were consumed. In one small town, over one thousand pounds of the seed were sold in one week during the invasion.

In the seven years prior to 1939, an average of 4,700 Purple Finches were banded throughout the country. In 1939 there were 21,592 of the birds banded. If the number banded in 1938, 6,477, is substracted from the 1939 total, the number banded as the result of the invasion was approximately 15,115. Each of six or seven banders was responsible for banding over one thousand of the birds. Several people banded almost two thousand.

THE HISTORY AND STATUS OF THE PURPLE FINCH IN THE NORTHEAST

Forbush (1929) gives the distribution of the Purple Finch in New England as follows:

"Common to uncommon resident up to heights of about 3,000 feet, rather irregular in winter and rare or wanting at that season in some northern parts of Maine, New Hampshire, and Vermont."

The more recent account by Bagg and Elliot (1937) gives under "Occurrence", the following:

"Technically a permanent resident, common in summer and sometimes abundant in migration, but highly irregular between early November and late March."

Minot in 1895 summarized its status by saying:

"Purple Finch—In New England, a common resident in summer, but only occasionally in winter."

This was supplemented, however, by William Brewster, who edited the second edition of Minot's book. Brewster added this footnote:

"A common summer resident, breeding nearly everywhere, but most numerously in the coniferous forests of northern New England. A few birds usually remain through the entire winter in southern New England and occasionally they occur at this season in extraordinary numbers throughout our entire territory. These fluctuations are apparently governed solely by the winter food supply and in no wise dependent on conditions of temperature or snowfall.—W. B."

Baird, Brewer, and Ridgway stated in 1875, that:

"It breeds from about the latitude 40 degrees to perhaps 60 degrees and in most parts between these parallels is rather a common bird in suitable localities. A few occasionally are found during the winter in Massachusetts but usually they pass the winter farther south. In the state of South Carolina they are especially abundant throughout the winter or from October until April.

"Dr. Coues states that the Purple Finch is a very abundant winter resident near Washington, arriving in October and remaining until May, being eminently gregarious. Stragglers were seen until nearly June, but the majority had departed as the leaves expanded.

"They make their first appearance in regular migration in Washington from the 10th to the 20th of May, occasionally a few are seen earlier."

The migration dates given by Dr. Chapman (1929) are of interest as they show some regularity in the spring and fall migrations throughout eastern United States. They are:

"Washington, common W.V., Sept. 12–May 26, largely a migrant. Ossining, rare P.R., common T.V. Cambridge, P.R. common from April to Oct., irregular, but sometimes abundant in winter. N. Ohio, common W.V., Sept. 1–May 20; Glenn Ellyn, fairly common T.V., March to April, Sept. to Oct., uncommon W.V."

Several returns of birds banded at Sault Ste. Marie, Michigan indicate a regularity in migration for one locality. A bird banded August 5, 1929 returned to the place of banding in 1930 on May 10; in 1931 on April 24; in 1932 on May 1; in 1933 on May 18; in 1934 on May 6, and in 1936 on May 2. Another bird banded July 28, 1922 also repeated for four years in late April or early May.

Some of the birds from New England and northern Michigan must travel into the deep south and even move considerably westward as the following returns will illustrate:

Band	*Date Banded*	*Place*	*Recovered*	*Date Recovered*
68905	Dec. 1, 1926	Middleboro, Mass.	Stuttgart, Ark.	Jan. 23, 1938
L62402	Aug. 31, 1934	Groton, Mass.	Warren, Ark.	Feb. 8, 1936
A128605	Feb. 14, 1929	W. Hartford, Conn.	Strawberry, Ark.	Jan. 28, 1938
37-2833	Dec. 30, 1936	Milton, Mass.	Grand Chateau, La.	Jan. 25, 1940
13570	June 25, 1922	Lakeville, Mass.	Warren, Ark.	Feb. 8, 1923
13571	June 25, 1922	Lakeville, Mass.	Warren, Ark.	Feb. 8, 1923
54393	Mar. 14, 1923	Wellesley, Mass.	Rockingham, N. C.	April 12, 1924
77230	Aug. 16, 1923	Peterboro, N. H.	Thornton, Tex.	Jan. 30, 1924
67227	Jan. 29, 1923	Norwalk, Conn.	Haynesville, La.	Feb. 1, 1924
L27215	May 5, 1939	Sault Ste. Marie, Mich.	Stuttgart, Ark.	Jan. 1, 1940
36-62261	May 13, 1936	"	Scottsboro, Ala.	Jan. 7, 1937
160792	May 29, 1925	"	Evansville, Tenn.	Jan. 22, 1927
160952	June 30, 1925	"	Smackover, Ark.	Feb. 14, 1926
118680	Sept. 4, 1923	"	Sparta, Tenn.	May 1, 1924

One bird banded in the south in the fall of 1938 appeared in the invasion of 1939. No. 39-38912 was banded October 1, 1938 at Baton Rouge, La. and was retaken at Milton, Mass. April 17, 1939

CAUSES OF INVASIONS

As indicated earlier, Brewster believed the fluctuations were governed solely by the winter food supply and were in no wise dependent on conditions of temperature or snowfall. Other authorities continue to express the point of view that such invasions are due mainly to food conditions.

Although the writer has found no significant data in the reports to explain the cause of this invasion, it is felt that before food is accepted as the primary cause of such invasions, more research is necessary. A careful analysis of all weather conditions in the northeast and middle-west is necessary for comparison with the time of the invasion. These conditions should then be compared with the circumstances of other similar invasions. Indeed it is a thesis problem in itself and will have to receive attention in another study which the writer contemplates. Perhaps, too, this may be one of the migration problems which defies solving and certainly it is one which invites continued research.

A few of the conclusions reached after studying the reports may be of interest, even though not too indicative. These birds should normally be farther south where food probably would be more abundant. Why should they leave these areas? This seems to be the same question raised when discussing regular migrations, especially in regard to the finches which leave northern states when seeds are most abundant, or start north when the seeds are relatively scarce.

However, Mr. M. J. Magee of Sault Ste. Marie, Michigan points out that there was a severe drought during the summer of 1938, preceding the invasion, and suggests that there was probably less food for the birds in the middle-west and south and that this may have driven the birds eastward and northward.

Some people feel that these birds congregated mainly from the northern regions of the winter range and were not birds which had gone very far south in the regular migration. Some evidence is at hand to support this, but the question still remains, as to whether the food conditions would be different enough to be the starting stimulus. Whether or not food was the starting stimulus, it seemed to have little to do with the spread and progress of the invasion. The first birds to arrive were moving rapidly and were not exhausting the food supply as they traveled. Areas traveled over in the beginning supported thousands of the birds for the duration of the period. Some of the first birds to arrive did not stop until they had spread to southeastern Pennsylvania and northern New Jersey.

Brewster's statement in regard to the weather and snowstorms

seems to be borne out by this feature of the invasion. In many parts of Maine, eastern New Hampshire and Massachusetts, the birds arrived in one of the biggest snowstorms which had hit the area for many years. Many observers and banders had not seen the birds prior to that time. It is understandable that some birds were probably in the area previously and were forced to the feeding stations by the three feet of snow that fell in some places. But it is peculiar that so many birds should put in their first appearance on March 12-13 when the storm arrived. Perhaps they were driven in front of the blizzard and could not escape it, but if weather has any major control over their movements, one would expect the birds to have gone into areas with less snow. This is primarily a local problem, however, and if one considers the effect of weather on the movements of these birds, an account would have to be taken of the general severity of the winter throughout the whole of the winter range.

Miss May Thatcher Cooke of the United States Biological Survey and others have expressed the opinion that such invasions must result from a certain tendency for the birds to become "bottled-up" because of numerous controlling factors, and then they are suddenly released and "spill over" into nearby regions.

For many years it has been known that Purple Finches possess this "wanderlust." They normally migrate southward for the winter and come northward again in the spring to nest. Their irregularity occurs mainly during the winter, but is not limited to the northern regions. The birds are known to make east and west migrations similar to those made by Evening Grosbeaks. According to Lincoln (1939) these migrations appear to have a certain regularity about them. Some of these birds were trapped in northern Michigan, taken at several points in New England, and then were retaken at the original places of banding.

Some observers have felt that the invasion resulted from a premature migration up the Connecticut and other parallel valleys, which was thwarted and thus the birds spread out into Maine, Vermont, Massachusetts and New Hampshire, and stayed in Connecticut, New Jersey, New York, and Pennsylvania until time to migrate northward normally. This would be a plausible explanation if the banding records and pluming observations supported it, but they do not. It also presupposes that the birds advanced through the southern areas unnoticed and then returned to these areas later in numbers and were trapped.

Mr. Charles H. Whittle of Hancock, N. H. observed in the spring of 1940 that the Purple Finches arrived May 1 at about the time the elms were in flower and that the birds fed almost exclusively upon them. He offers the possibility that this might have had some control over the 1939 invasion. The 1939 invasion started in late

February and extended through May and it seems highly improbable that any trees offering food to Purple Finches in the spring would be in bloom or would have changed from winter condition by March 1 in the northern states.

Intensive study of future invasions when conditions can be compared with those of the 1939 invasion may reveal the answer but it remains unsettled at this time with the amount of available information.

PURPLE FINCH INVASIONS

Only one other major invasion of New England by Purple Finches has been known to have occurred, although several minor ones are evident. Brewster referred to the other major invasion in his footnote in Minot's book of 1895, and he described it more fully in his "Birds of the Cambridge Region" (1906), where he says:

"At the latter season (winter) they occur somewhat irregularly and usually sparingly, but I have known them to be present in immense numbers and continuously, from December to March. This was the case during the winter of 1883–1884 when flocks containing upwards of fifty, or even as many as seventy-five to one hundred Purple Finches each, were repeatedly met with in Belmont and Waverly. On January 17 of that winter I saw fully two hundred along the roadsides while driving from Belmont to Cambridge."

In Brewster's Journals of 1883-1884, extracted by Mr. Ludlow Griscom, a letter from Manley Hardy of Brewer, Maine states:

"Only one previous record for this section. Surprised to find Purple Finches lingering through November. They began increasing about the middle of December and on the 22nd they were scattered everywhere in small numbers."

Another letter from Mr. Hardy of January 2, 1884, says:

"Present everywhere in increasing numbers."

From Providence, R. I., Brewster received a letter from Mr. Jenks, a taxidermist and natural history supply dealer who was a constant correspondent of his. He wrote on January 17, 1884:

"I have received no less than seventy specimens of the Purple Finch from the Rangeley Lakes region, Maine. This bird is now remarkably abundant about Providence, R. I."

Bagg and Elliot (1937) cite an earlier invasion but few data are available from which to judge the proportions. They quote from J. A. Allen (1864) as follows:

"This species seems, judging from the accounts of the older naturalists, to have greatly increased, in this and other eastern states, during the last twenty-five years. At Springfield it is chiefly a transient, rather common in April and September–October but never so abundant as at Cambridge where, in 1863, it was the most numerous bird (?) from March 25 to April 20."

Since 1884 the minor fluctuations which have occurred in the winter and breeding ranges are as follows:

Wendell P. Smith of Wells River, Vermont observed small fluctuations during the period January 31 to March 15, 1923 when he banded 48 birds, also February 23 to March 21, 1928 when he banded 52 Purple Finches. Ordinarily there would be very few if

any present at Wells River in this period. They appear only every 5 or 6 years. In 1939, Mr. Smith banded 101 of the birds.

Additional evidence supporting the 1928 invasion is found in Bagg and Elliot's book (1937). Numerous observers in western Massachusetts reported sizable flocks and Professor F. A. Saunders banded four hundred at Mount Holyoke College.

Mr. Glenn D. Chamberlain of Presque Isle, Maine also noticed this influx of 1928 when he banded 54 birds in early February, several more than in 1939. In both cases he banded all that came to the station and entered the traps.

Mr. B. S. Bowdish of Demarest, N. J. also had a rather successful year in 1923-4 when he banded 550 of the birds.

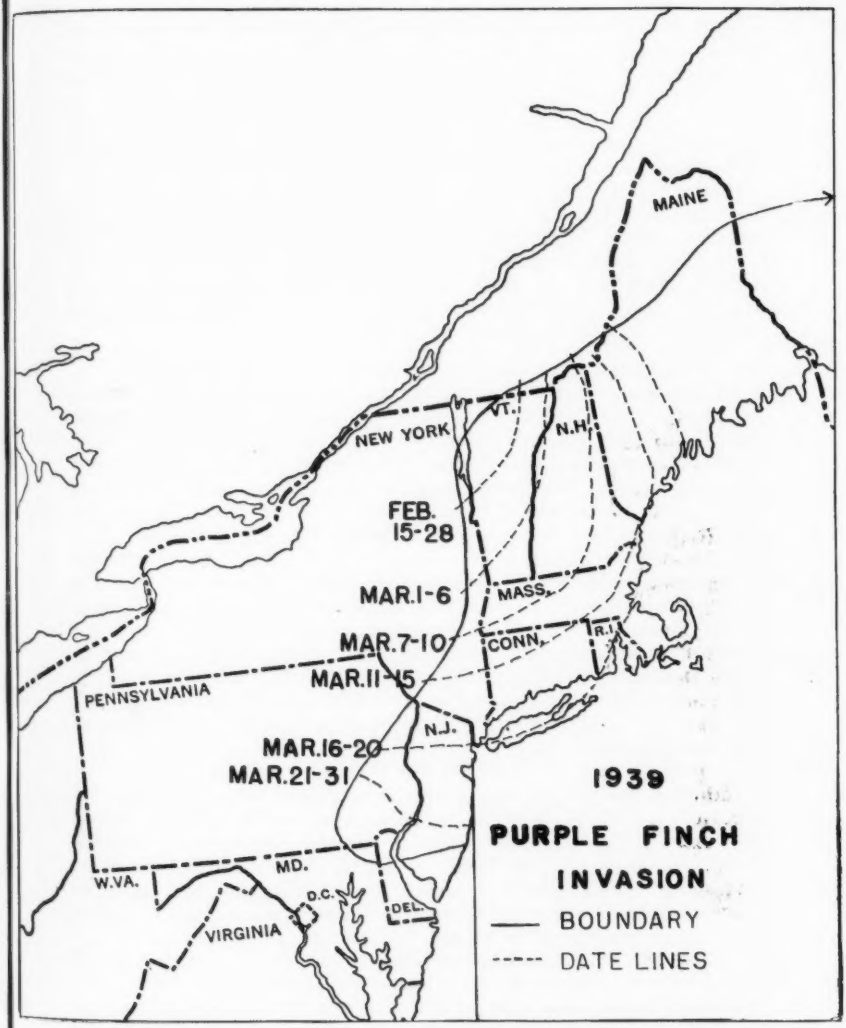
The yearly totals of the birds banded at the Wharton Banding Station at Groton, Mass., as reported by Mr. Edwin Mason, show no marked fluctuations since 1930 except the one in 1939. The totals of Purple Finches banded in these years were as follows: 1930—25, 1931—37, 1932—89, 1933—75, 1934—82, 1935—103, 1936—180, 1937—110, 1938—146, 1939—1123. A general increase has been taking place in this period or else banding operations have been gradually increased.

Dr. Arthur A. Allen at Ithaca, N. Y. summarized the Cornell records as follows:

"The Purple Finches were unusually common during the winter and spring and summer of 1938. In the early fall of 1938 they disappeared, so that by December there were apparently none around, nor were any reported during January and February. In March a few were seen and by the middle of April they were once more quite regularly distributed although not in the abundance that they were the preceding year. They continued in fair numbers until the middle of May and then again disappeared except for a few breeding birds. They have not been at all common since (letter January 16, 1940). We apparently, therefore, did not get the invasion that you did, or if we got it, it was the year earlier."

There may be some correlation between the 1938 occurrence of finches at Ithaca, N. Y. and the experience of Mr. M. J. Magee at Sault Ste. Marie, Michigan. In the seventeen years of banding Purple Finches, Mr. Magee had the largest number, 2326, enter the traps in 1938. In 1939 the total of 1,121 was 15% below the seventeen year average of 1,328 birds. Perhaps the birds from the area participated in our invasion of 1939. He gave as the reason for the decrease in 1939, the drought of the summer before.

Mr. S. H. Weakley of Fort Smith, Arkansas records two minor invasions during eleven years of banding, one in 1933 when 158 birds were banded and one in 1939 when 540 birds were banded from January to February. Birds were taken in only five of the eleven years and the total was but 41 birds in all. This latter invasion would certainly not have much connection with the New England one, and yet the stimulus for the two may well have been the same and the birds may have come from similar localities.



Map with date lines showing the spread of the Purple Finches from the north and west to the south and east, based on the peaks of abundance as indicated by banding results.

Mrs. A. L. Whigham of Century, Florida noted more finches in 1939 than in any previous year. Prior to 1939 only a limited number of the birds visited her station during late winter, but in 1939 at least 200 of the birds appeared and this was about four times the usual number. A shortage of wild berries is suggested as the reason inasmuch as other berry eating species such at the Robins were also more common at this time.

In the fall of 1939–40, a reoccurrence of large numbers of Purple Finches in the Ardmore, Pa. region adds still another chapter to this complex story. Mr. Horace Groskin has banded about 500 of the birds in this period which is by far the most he ever banded in fall and early winter. In 1937–38 only 54 birds were banded before March 1, and in 1938–39 only 43 were banded prior to the heavy concentration which occurred after March 1.

Corresponding Invasions of Redpolls and Siskins

The 1939 season was not only an unusual one for Purple Finches but also for Pine Siskins and Redpolls and to some extent Crossbills. The Siskins and Redpolls accompanied the Purple Finches southward arriving at about the same time and dispersing to the northward with them. The Siskins traveled in numbers as far southward as Ardmore, Pa. where 160 were banded. At Hanover 142 Siskins and 248 Redpolls were banded during the invasion of finches. The Redpolls were centered a little more to the north than the Purple Finches and Siskins. Thousands of Redpolls were observed moving northward along the Connecticut Valley during the first week of April. Both Siskins and Redpolls came to the stations with the Purple Finches and gorged themselves on the smaller food such as millet and hemp. White-winged Crossbills while not as numerous as the other three mentioned did arrive in numbers around Hanover, New Hampshire, Wells River, Vermont, and Bar Harbor, Maine in March and April.

Extent of the Invasion

The area covered by the Purple Finch invasion of 1939 can be delimited as follows: heaviest populations in southern Maine, all of New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, southeastern New York, northern and central New Jersey, and eastern Pennsylvania; smaller populations invaded northern Maine and the Maritime Provinces, and northern Maryland. Nothing unusual was noted in southern Ontario, Quebec, central New York, central Pennsylvania, or Washington, D. C. The area invaded has been indicated on the map on page 85.

Some of the data obtained from the observers located on the periphery of the area invaded are of interest. Professor V. C. Wynne-Edwards at Montreal, Canada noted that the birds were not present in more than ordinary numbers during the winter of 1938–39 but lists 1932–33 and 1934–35 as years when he considered

them abundant and 1937–38 as a year when they were very scarce.

Mr. Robie Tufts, Chief Federal Migratory Bird Officer for the Maritime Provinces, saw some evidences of an invasion throughout the provinces but kept no records of numbers. The extent of the invasion in this region is illustrated somewhat by the number of birds retaken throughout the Maritimes during the period. They were as follows:

	Banded		*Recovered*	
38-141730	April 29, 1938	Milton, Mass.	April 1, 1939	Glencoe, Pictou Co., N. S.
37-65122	July 25, 1937	Milford, Mass.	Mar. 29, 1939	Charlotte Co., N. B.
36-134634	May 1, 1936	N. Scituate, Mass.	Mar. 10, 1939	St. Joseph, N. B.
38-79267	May 5, 1938	Albion, Maine	Mar. 25, 1939	Kingston, N. B.
37-144380	July 7, 1937	Northeast Harbor, Me.	April 10, 1939	Bayswater, N. B.
H750085	Oct. 10, 1937	Demarest, N. J.	Mar. 20, 1939	Sambro, N. S. (Halifax)
38-58276	April 30, 1938	Belmont, Mass.	Mar. 31, 1939	St. Mary's Co., N. S.

Mr. Arthur H. Norton of Portland, Maine outlined the extent of the invasion in Maine as follows: "abundant in the vicinity of Portland, (no records for York County), eastward at least to Mt. Desert, and northward at least to Presque Isle in the northeast and Rumford in the northwest."

Mrs. Merty R. Webb of Albion, Maine and Mr. Clarence Aldous of Orono, Maine recorded hundreds of the birds in those areas. Mr. Glenn Chamberlain of Presque Isle banded 51 but indicated nothing unusual.

The only records for southern Canada in Quebec and Ontario were made by Dr. Harrison F. Lewis, Chief Federal Migratory Bird Officer for those provinces. He found two on the north side of Lake Erie on Long Point on April 18, but found none on February 3–4 near the Vermont line in Quebec.

In eastern New York, Mr. Guy Bartlett observed that the invasion was not as pronounced at Schenectady as in New England. Dr. Dayton Stoner said they were less common in Albany in 1939 than in 1938.

At Mohonk Lake, N. Y., which is situated about fifteen miles west of Poughkeepsie, Mr. Daniel Smiley, Jr. saw one or two Purple Finches on several different occasions, which is their usual winter status there. He recorded the first migrant on April 1, but saw no flocks or large numbers of the birds at any time.

Dr. Arthur A. Allen's summary for Ithaca, N. Y. given previously indicated a possible influx in 1938 but nothing unusual for 1939.

At Manorville and Elmhurst, Long Island the birds did appear, but in small numbers. They had been observed very rarely previous to 1939 by Mr. Gilbert S. Raynor and Mrs. Marie V. Beals.

The heaviest concentration in Pennsylvania seemed to have occurred in the vicinity of Philadelphia, especially around Ardmore, where hundreds of the birds were banded. The stations at Swarthmore, Wayne, Chestnut Hill, Wyncote, Glenolden, Norristown, and Paoli accounted for several hundred in addition to the 1,146 banded by Mr. Horace Groskin at Ardmore. Mr. William Pepper, Jr. at

Wyncote banded 113 in 1939 and only 9 in the ten years previously. Mr. John Dorman of Chestnut Hill banded 297 in 1939 and only 100 in 1938. Mr. Groskin's banding increased from 106 in 1938 to 1,146 in 1939 and is again above 500 in 1940

Dr. Harold Wood of Harrisburg, Pennsylvania saw twenty finches and banded one during the winter. From his tabulation of birds recorded in previous years this is less than the normal number since he saw 45 in 1938, 39 in 1937, 19 in 1936, 162 in 1935, 4 in 1934, and 114 in 1933. Dr. Merrill Wood and Dr. Logan Bennett noticed no signs of the invasion at State College, Pennsylvania, the winter population being normal in 1939.

According to Miss May Thatcher Cooke of the United States Biological Survey, no great number of Purple Finches was banded in 1938-39 south of the above mentioned localities.

ORIGIN OF THE INVASION

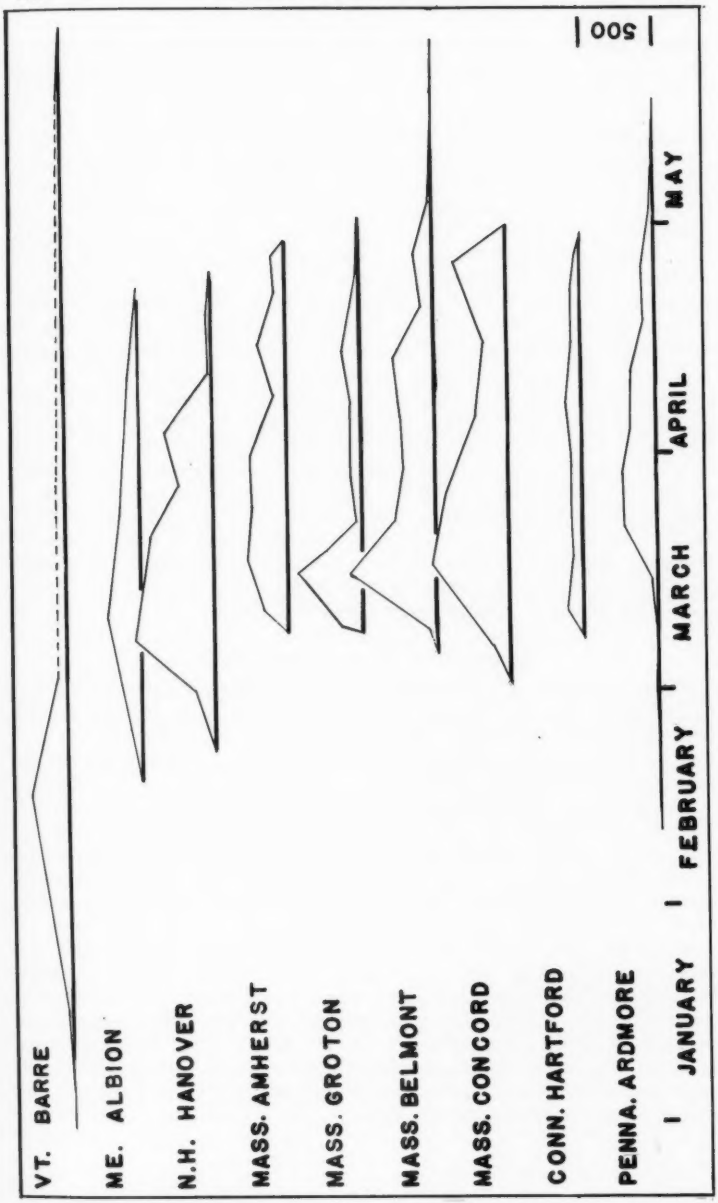
Many of the birds participating in the invasion were birds which had previously been in New England. This is illustrated by the following returns of birds caught in 1939 and banded in previous years. Two birds banded in May 1938 in Maine were caught in New Brunswick in March 1939. Four others caught during July and August 1937 in Maine were retaken in March and April 1939 in Pennsylvania, Massachusetts and New Brunswick. Other birds banded in the three years previous to 1937 were retaken in March and April in Pennsylvania and Maine. Five birds banded in April 1938 in Massachusetts were retaken in March and April in Connecticut, Maine, and Nova Scotia. Several banded in Massachusetts in August and September 1938 were retaken there in March, April and May 1939. Two other birds banded in Massachusetts, one in 1937 and one in 1936, were recaptured in New Brunswick in March 1939. One bird banded at Boonton, N. J. April 8, 1938 returned to Boonton March 28, 1939. Another banded at Demarest, N. J. in October 1937 was retaken in March, 1939 at Halifax, Nova Scotia. One banded October 19, 1931 at Elmhurst, Long Island returned to Woodbridge, Conn. March 17, 1939. One banded in October 1938 in Baton Rouge, Louisiana also participated in the invasion, being recaptured April 17 at Milton, Massachusetts.

There was some indication of a movement from west to east and from east to west. The following four instances were reported:

	Banded		*Recovered*	
138-2424	May 22, 1938	Sault Ste. Marie, Mich.	Mar. 10, 1939	Ardmore, Pa.
39-163068	Mar. 29, 1939	Ardmore, Pa.	May 1, 1939	Sault Ste. Marie, Mich.
39-143366	Mar. 12, 1939	Boonton, N. J.	April 13, 1939	Branchport, N. Y.
39-15525	Mar. 17, 1939	Concord, Mass.	April 9, 1939	Coldsprings, N. Y.

Therefore, some birds were originally banded in the area invaded and had gone elsewhere prior to the invasion, while some came from the south and others from the west.

As to just which route was used in reaching the area invaded,



Graphs showing the fluctuations of banding of Purple Finches at nine representative stations throughout the region invaded in 1939.

little is known. The fact that the birds first appeared in numbers in the northern states and the peaks of abundance were successively reached going southward, complicates the problem. If the birds were to have returned by the regular route taken when coming northward in the spring, banders in the southern part of the area should have had the birds appear at their stations before those in the north. If the birds were to have come from the west generally, observers in central Pennsylvania and New York should have seen them and the birds would have appeared at such places as Ardmore, Pa., Fairfield, Conn., Amherst, Mass., and Hanover, N. H. at about the same time. As it happened, the birds appeared in the northern and western part of New England and worked southward and eastward. How they were able to reach this area unnoticed is also hard to explain. There are few observers or banders in the region from which the birds seemed to have temporarily originated.

The birds must have migrated southward and possibly westward in the fall of 1938. Conditions, possibly scarcity of food due to the drought, caused the birds to move back northward and eastward. They could have reached Vermont and New Hampshire through the large area bordering the Great Lakes and northern New York in small enough numbers to be unnoticed. Their congregation in the small area later occupied, then caused the influx to become an invasion. Some of the birds returned in this general direction while others moved northward to their former nesting grounds, when the regular migration took place in April and May.

DIRECTION OF THE MOVEMENT

Three sources of information were available to determine the direction of the movement of the Purple Finches as they spread throughout the northeast. They were:

(1) Observations and records of banders indicating when the maximum abundance occurred at the various localities.

(2) Returns of birds banded during the invasion.

(3) Observations of plumed birds, marked at Hanover, N. H. during the entire period of the invasion. At least three hundred letters were received in response to requests regarding the whereabouts of plumed birds, one hundred of which contained specific usable information.

From the first source of information the graph on page 89 was prepared indicating when the peaks of abundance were reached in each locality. The date lines show the general spreading from the north and west to the east and south. The key localities for the construction of the chart were : Barre, Vt., Hanover and Manchester, N. H., Albion and Orono, Me., Athol, Groton, Belmont, and Concord, Mass., Hartford and Fairfield, Conn., Demarest and Boonton, N. J., and Ardmore, Pa.

From the banding returns and the observations of plumed birds the direction of movement can be more accurately determined. For convenience of treatment the records have been arranged in approximately fifteen day periods.

PERIOD 1, FEBRUARY 10–28. The birds which were banded or plumed during the month of February were all taken in New Hampshire and Vermont. All of the observations and returns were to the south, southeast, and east. The map number 1 on page 93 shows the observations of white plumed birds marked at Hanover, N. H. from February 20–26. Seven of the twenty-one were seen in March, while eleven were observed on scattered dates throughout April and three were seen in May. Mrs. Elaine Drew reported fifteen observations of plumed birds in the vicinity of Barre, Vt., and none of them were of birds plumed in this period. One white-plumed bird remained at Hanover until July 2 and probably nested, being observed by Dr. Frederic P. Lord. Another one was feeding at the station of Mrs. Frank Dubois of Georgetown, Mass. as late as May 27. The following were the only returns of birds banded in February and recaptured during the invasion:

	Banded		*Recovered*	
138-109962	Feb. 27, 1939	Barre, Vt.	Concord, Mass.	April 23, 1939
39-134670	Feb. 24, 1939	Hanover, N. H.	Amherst, Mass.	April 24, 1939
39-134670	Feb. 24, 1939	Hanover, N. H.	Hamden, Conn.	April 5, 1939

PERIOD 2, MARCH 1–15. In the period of early March the birds spread rapidly to the south into southern Connecticut and northern New Jersey and east into Maine as shown on Map 2 page 93. The birds plumed at Hanover in the period February 27 to March 10, received yellow plumes. Seven of the sixteen observations of yellow plumes south of Hanover were made in March while the others were made before April 20. One bird reached Ridgewood, N. J. by March 11. Only two were seen in eastern Massachusetts, whereas the majority of the ones plumed in the previous period were seen in that region. Of the nine observations made north of Hanover, not one was made in March, the month of banding. All were made after April 11, showing that a month had elapsed after banding before any were seen to the north. Since some of the birds banded in this period were in Hanover until March 30 as shown by the repeats at traps, the records north of Hanover may represent the birds that went no farther than Hanover, but it is just as probable that they had gone south and were seen on their return trip north.

The banding returns for this period bear out the above conclusions based on the plumes. All birds banded in New Hampshire March 1–15 were retaken to the south. Of the four birds banded in Hanover and retaken elsewhere, one was taken directly south in the Connecticut Valley in Massachusetts, two farther south in Connecticut, and one in New Hampshire to the southeast. Even

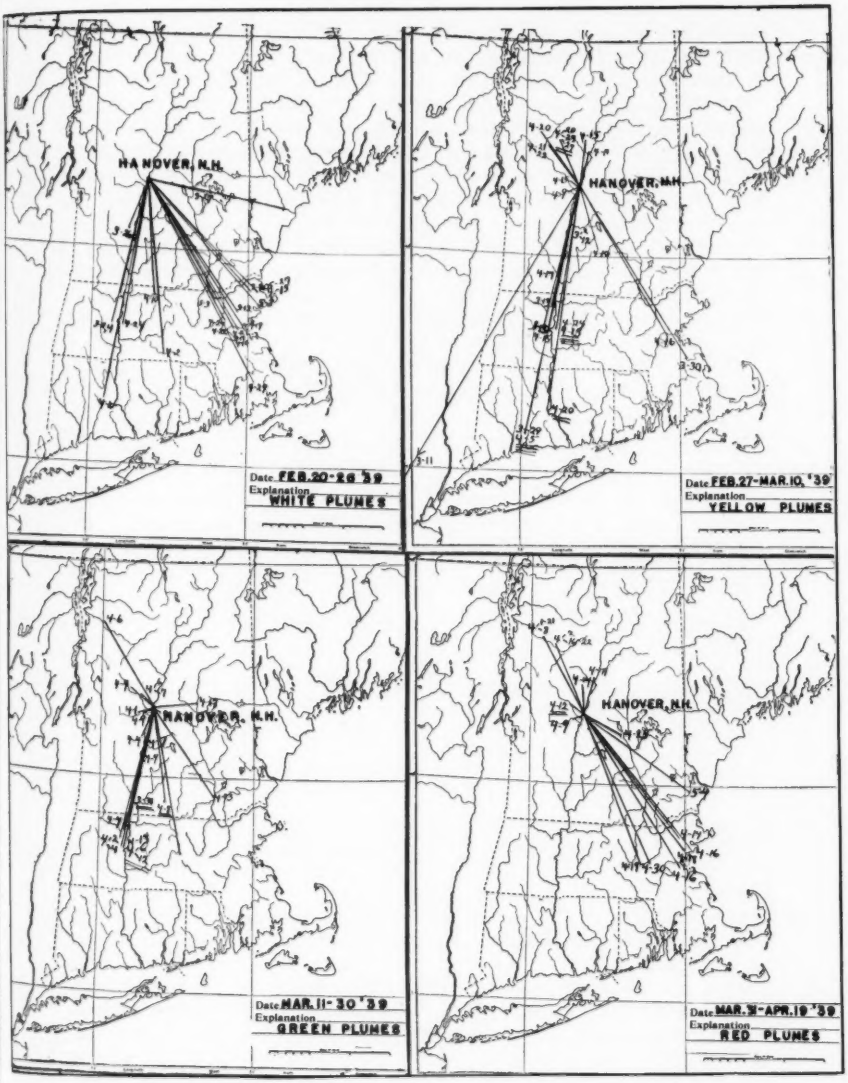
the bird banded at Manchester, N. H. on March 15 took a southwestern route to Hartford, Conn. in the general direction taken by the yellow plumed birds. Six of the birds banded in Massachusetts March 1–15 were likewise taken again in Connecticut to the south or southwest and two reached Ardmore, Pa. Four birds were retaken to the north of the place of banding but over a month had elapsed in each case and the distance was not very great. One return of a bird banded in Connecticut was also taken to the north 31 days after banding. One banded March 12 at Boonton, N. J. moved west to Branchport, N. Y. in 33 days.

The returns of the birds banded in this period March 1–15 and upon which the foregoing discussion is based, were as follows:

	Banded		*Recovered*	
New Hampshire				
39-134667	March 1	Hanover	April 13	Amherst, Mass.
39-151540	March 3	Hanover	April 5	Hamden, Conn.
39-151411	March 4	Hanover	April 20	Hartford, Conn.
39-151900	March 15	Hanover	April 9	Dublin, N. H.
138-3404	March 15	Manchester	March 29	Hartford, Conn.
Massachusetts				
138-481	March 1	Athol	March 11	Hartford, Conn.
38-185254	March 3	Athol	March 26	Hartford, Conn.
138-563	March 6	Athol	April 5	Ardmore, Pa.
138-594	March 7	Athol	April 24	Hartford, Conn.
139-23675	March 9	Groton	May 11	Nashua, N. H.
39-126447	March 10	Amherst	April 15	Manchester, N. H.
39-152797	March 10	Concord	March 19	Hamden, Conn.
39-126498	March 11	Amherst	March 29	Hartford, Conn.
139-23767	March 11	Groton	April 6	Hartford, Conn.
139-14160	March 12	Northampton	April 28	Barre, Vt.
139-27069	March 12	Groton	April 12	Athol, Mass.
139-27076	March 12	Groton	May ?	Rindge, N. H.
138-7397	March 13	Belmont	April 3	Ardmore, Pa.
139-27152	March 14	Groton	March 20	Sturbridge, Mass.
138-4296	March 14	North Eastham	April 3	Groton, Mass.
Connecticut				
139-24711	March 10	Hartford	April 9	Northampton, Mass.
38-69559	March 15	Hartford	April 27	Windsor, Conn.
New Jersey				
39-144366	March 12	Boonton	April 13	Branchport, N. Y.

PERIOD 3, MARCH 16–31. In this period the birds continued to move southward but plumed ones did not travel as far as in the previous period as can be observed on Map No. 3 on page 93, although several banded ones from Massachusetts did reach Ardmore, Pa. The main part of the northward and westward movement occurred in this period and is illustrated especially in the returns from birds banded in Connecticut, New Jersey, and Pennsylvania. The beginning of the movement was evident at the end of the last period, however.

Green plumes were used in the days from March 10–31. Peculiarly there were no observations of this color in the Boston region. The northern records were made very soon after the banding period and might represent birds banded on their return trip from the south. Many of the birds banded in this period at Hanover, N. H. remained in the area until April 3 and a few until April 20. Two birds marked with green feathers probably nested in Hanover as



Maps showing the observations of the plumed Purple Finches marked with four different colors of feathers representing different periods of banding at Hanover, New Hampshire.

they were observed on May 24. Likewise one was seen at Taftsville, Vt. May 13 and might have remained.

The five birds banded in New Hampshire and listed below illustrate a spreading in all directions. The birds banded in Massachusetts in this period indicate a continued movement to the southward with one bird going west from Concord to Cold Springs, N. Y. in 24 days. A bird from New Jersey banded at Boonton went north to Mohonk Lake, N. Y. in 8 days. An exception to the southward movement was the one bird banded at Groton, Mass., and retaken at Dublin, N. H. 11 days later. Several others banded in Pennsylvania went northward and one went westward as far as Sault Ste. Marie, Mich., making the trip in 34 days. One individual banded March 18 at Hartford, Conn. was retaken during the nesting season in the White Mountains of New Hampshire.

Returns of birds banded March 16–31, 1939 and retaken during the period of the invasion in 1939 were as follows:

Banded			*Recovered*		
New Hampshire					
39-153791	March 17	Hanover	March 31		Brattleboro, Vt.
39-154029	March 26	Hanover	April	13	Manchester, N. H.
39-57292	March 27	Dublin	May	5	Winchendon, Mass.
39-153669	March 30	Hanover	April	24	Royalton, Vt.
39-153614	March 30	Hanover	April	12	Northampton, Mass.
Massachusetts					
139-33911	March 17	Northampton	April	6	Hartford, Conn.
39-155025	March 17	Concord	April	9	Cold Springs, N. Y.
39-155079	March 18	Concord	April	8	Wyncote, Pa.
?	March 18	Athol	April	4	Ardmore, Pa.
139-32627	March 18	Groton	April	30	Demarest, N. J.
?	March 26	Amherst	April	13	Athol, Mass.
?	March 26	Amherst	April	4	Williamstown, Mass.
139-32847	March 30	Groton	April	9	Dublin, N. H.
Connecticut					
38-69597	March 18	Hartford	July	24	White Mt. Nat. For., N. H.
New Jersey					
39-159507	March 22	Boonton	March	26	Ardmore, Pa.
39-161011	March 25	Boonton	April	2	Mohonk Lake, N. Y.
Pennsylvania					
39-155079	March 18	Wyncote	April	8	Concord, Mass.
138-8254	March 25	Ardmore	May	22	Clarksville, N. H.
39-163068	March 29	Ardmore	May	1	Sault Ste. Marie, Mich.

PERIOD 4. APRIL 1-15. In this period the birds were moving northward from the southern portions of the territory invaded. Plumed observations of birds marked with red feathers March 31 to April 19 showed some birds still going southward, as outlined on Map No. 4, page 93. Eight birds were reported south of Hanover, most of them from eastern Massachusetts. This is of interest since there were none in this region for the previous period. It is peculiar that there were none observed in the Connecticut Valley, which was so popular in March. Many of the records to the north were made within the banding period so that the birds were moving in both directions from Hanover. One red plume was seen at Hanover as late as May 4, and one at Canaan, N. H. by Mrs. Alice McAllister, May 15.

One bird banded April 11 in Waterville, Me., went to Dorset, Ont., where it was found August 15, and one banded at Belmont, Mass.,

April 3 was found at Eagle Lake, Maine June 24. The April 14 Amherst record indicates a definite northward movement as it was taken 15 days later at Barre, Vt., as does the one banded at Wyncote, Pa., April 8 and retaken at Conway, Mass., April 25. These are supplemented by one banded April 6 at Hamden, Conn., and recaptured April 24 at Concord, Mass. No returns were taken in this period noticeably south of the place of banding but the evidence obtained by the red plumes shows some birds were still going south as late as this.

Returns of birds banded from April 1–15, 1939 and retaken during the period of the invasion were as follows:

New Hampshire	*Banded*		*Recovered*	
None				
Maine				
39-168223	April 11	Waterville	Aug. 15	Dorset, Ont.
Massachusetts				
139-50540	April 3	Belmont	June 24	Eagle Lake, Me.
139-54826	April 9	Concord	April 24	Hancock, N. H.
39-168345	April 14	Amherst	April 28	Barre, Vt.
Connecticut				
139-36627	April 6	Hamden	April 24	Concord, Mass.
New Jersey				
39-164645	April 3	Boonton	May 3	Morristown, N. J.
Pennsylvania				
38-57963	April 8	Wyncote	April 25	Conway, Mass.

PERIOD 5. APRIL 16–30. Only a few returns were available for this period as most of the birds had moved northward and westward by this time. Several local returns as from Concord to Groton, Mass., indicated local and possibly northward movements. Certainly the two captured at Belmont showed a continuation of local wandering and shifting despite the general northward migration toward the breeding grounds. Very few plumes were added during this period and no significant data obtained from them.

Most of the birds nesting to the north of Pennsylvania, New Jersey, and southern New York would normally have departed by now and the regular migrants going northward would have gone through. Some of the birds participating in the invasion were recaptured within the same breeding season to the north of where they were banded.

Returns of birds banded April 16–May 3, 1939 which were retaken during the period of the invasion were as follows:

	Banded		*Recovered*	
Massachusetts				
139-59874	April 21	Concord	April 28	Belmont, Mass.
139-65330	April 22	Concord	April 28	Belmont, Mass.
139-58043	April 28	Concord	April 30	Groton, Mass.
139-80884	May 3	Concord	May 14	Groton, Mass.

DURATION OF THE INVASION

By charting the banding records of the banders who were able to band a considerable number of birds, the time and duration of the invasion can be seen to have extended from February to May. Nine localities were selected for the graph on page 89 and the records were plotted individually above each other so that the begin-

ning, the ending, and the various peaks of abundance reached during the invasion can be easily compared.

As was pointed out earlier, the peaks of abundance were reached in the northern states before they were in the southern part of the area invaded. Vermont was first, followed by New Hampshire, Maine, Massachusetts, Connecticut, and finally by New Jersey and Pennsylvania. The three Massachusetts localities situated near Boston and fairly close to each other, Groton, Belmont, and Concord, confirm the fact that the peak of abundance was reached there about the middle of March.

The birds left the various areas at about the same time, which was near the end of April and the beginning of May. The departure was less regular than the arrival and more difficult to follow. In the cases of Barre, Vt., Belmont, Mass., and Ardmore, Pa., where banding was continued into May, no doubt a number of regular migrants were banded.

Although banding alone is not necessarily a true index of the abundance and length of stay, due to the fluctuations in emphasis at the various stations, it does show a general trend and is perhaps rather accurate in this instance. The banders soon became cognizant of the unusual situation and banded as many birds as could be enticed into the traps. In most cases, too, the daily fluctuations of birds trapped were small and when weekly averages are used the error is not very great.

The northward movement of the vagrants coincided with the regular spring migration northward. The birds moved to the breeding areas in April and May and a few were taken during or near the breeding season. They were as follows:

	Banded			*Recovered*
138-8254	Mar. 15, 1939	Ardmore, Pa.	May 22, 1939	Clarksville, N. H.
39-168223	April 11, 1939	Waterville, Me.	Aug. 15, 1939	Dorset, Ont.
38-69597	Mar. 18, 1939	Hartford, Conn.	July 24, 1939	White Mt. Nat. For., N. H
39-154678	Mar. 12, 1939	Concord, Mass.	July 1939	Kenogame, Que.

TURN-OVER OF POPULATIONS

Failure to give explicit directions for the tabulation of the repeat data, caused such a variation in the reports that very little comparable information was collected. Therefore, a limited number of localities can be compared. The following table gives the percentages of the birds repeating at four localities for six banding periods:

Place	*Feb. 15–28*	*Mar. 1–15*	*Mar. 16–31*	*April 1–15*	*April 16–30*	*May 1–15*
Albion, Maine.....	23	45	43	14	0	..
Hanover, N. H.....	14	35	18	0	0	..
Groton, Mass.....	..	70	53	25	15	..
Ardmore, Pa.....	46	29	31	36	25	17

The period when the greatest percentage of birds repeated in Maine, New Hampshire and Massachusetts was March 1–15, followed by March 16–31. Although the percentage for Ardmore, Pa. is highest in the latter part of February only a negligible number of

birds was banded, and the high during April 1–15 is more nearly the representative one.

At Hanover, N. H., of the 130 birds banded in February, five remained until March 31 and none stayed longer. Of the 766 birds banded March 1–10, only seven remained one month and all had departed by April 20. The largest number of this group of 766 birds left within ten days and a small proportion stayed over the twenty day period. From March 11–20, 237 birds were banded and only three of these were present one month later, most of them having departed during the first ten days. From March 21–30, 345 birds were banded and three were present April 19, but all the others had departed before April 3, many leaving by March 30. This was the period of greatest turn-over during the invasion at Hanover.

At Groton, Mass., a great number of the birds repeated in the first part of the period after banding. Of the 160 birds banded in the first half of March, 47 remained beyond April 1, several staying until April 26. Of the 340 birds banded during the last half of March, 11 remained beyond April 16, and none stayed longer than April 26. Of the 220 birds banded in the first half of April, only three stayed until April 26. Of the 80 birds banded the latter half of April, three remained until May 1 only.

At Belmont, Mass., 300 birds were banded March 1–15, and 9 remained one month or more. Of the 583 birds banded March 16–31, only 4 remained one month, 3 others three weeks, 13 two weeks, and the others one week or less. Of the 557 birds banded April 1–15, 1 stayed four weeks, 1 three weeks, 19 two weeks, 91 one week, and the others were not recaptured. Of the 234 birds banded April 16–30, 1 stayed four weeks, 2 two weeks, and 42 one week. Of the 21 birds banded in May, 1 remained three weeks, 1 two weeks, and 4 repeated only during the first week.

At Ardmore, Pa., the following records are of interest, showing the average length of stay and the number of birds banded in each period:

	Birds banded	*Aver. stay*		*Birds banded*	*Ave. stay*
Feb. 10–16.....	10	50 days	Mar. 31–April 6..	192	11 days
Feb. 17–23.....	8	37	April 7–13.....	179	9
Feb. 24–Mar. 2..	23	39	April 14–20.....	83	7
Mar. 3– 9.....	6	32	April 21–27.....	97	5
Mar. 10–16.....	49	24	April 28–May 4..	36	6
Mar. 17–23.....	213	21	May 5–15.....	11	4
Mar. 24–30.....	239	16	Total.....	1,146	Ave 15

These figures show the gradual decrease in the length of stay from the beginning of the period in February to the end of the invasion in May. Prior to March 17 the numbers were fairly constant, averaging above thirty days, from March 17–31 the average was around twenty, in the first half of April the average dropped to ten and from then until May 16 it was around 5. About 68% of the birds banded at Ardmore passed through the station without repeating.

TIME OF THE INVASION

BARRE, VERMONT—MRS. ELAINE DREW. Three birds arrived at the feeding station December 27, 1938 and the first bird was banded on December 31. The birds continued to appear in numbers so that forty-two were banded during January. During February 258 were banded, 83 during the first half of the month and the rest near the end of the month. The absence of Mrs. Drew for eight weeks in March and April, prevented the banding records from showing the continuous increase observed elsewhere, but the birds were present in sufficient numbers upon her return, so that she was able to band 61 during the last week of April and 27 during the month of May. Mrs. Drew estimated that she was able to band from one-half to one-third of the birds present at ony one time during the invasion.

WELLS RIVER, VERMONT—MR. WENDELL P. SMITH. The last Purple Finch of the fall of 1938 was seen at Wells River on November 11. The first appearance of the invasion occurred December 16, 1938 when two were observed. On December 20 a walk of eleven miles yielded two flocks numbering 23 individuals. Small numbers were seen at rather long intervals throughout January and February, but March brought an increase. March 15 marked the arrival of large numbers and the population remained larger than normal until April 16. After the latter date the usual migrant population was noted. Mr. Smith's banding records support the observations above. He banded the first bird February 8 and the second on March 6. Seven were banded March 15 and by April 16 a total of 101 were banded.

BRUNSWICK, MAINE—DR. ALFRED O. GROSS. "We had an unprecedented influx of Purple Finches in Brunswick about March 10. At one time I had fully a thousand individuals about my feeding shelves. The bulk had left by the end of the month. Similar reports of great numbers came from Lewiston, Bar Harbor, and Bangor."

ORONO, MAINE—MR. C. M. ALDOUS. "Some time about March 15, 1939 Purple Finches in numbers far in excess of normal were first observed about the buildings on the campus of the University of Maine. Sixty-two were trapped and banded on March 20 and 21. The birds remained around the campus and vicinity until April 1 when they began to thin out."

ALBION, MAINE—MRS. MERTY R. WEBB. "I saw no finches until February 6. On that date a flock of 40 or 50 came into the top of several elms in the yard. They remained only about five minutes. The same flock or another returned February 8. From then until February 16 a flock appeared in the yard for a few minutes at least once a day, but did not feed at the traps. I banded my first bird February 16 and continued to band them until the middle of April. Fifty to seventy-five finches were around February 16–26, 31 of them being banded. The birds then increased greatly with 33 being banded in two days. During the first week of March, 60 others were banded and on March 13 they arrived in great flocks during a severe snow storm. At least 200 were present, 110 being banded from March 8–13, and 171 from March 14–21. The greatest concentration was from March 9–31. During April, 89 were banded, the last one being trapped April 24, After April 13 only a few birds fed regularly in groups of five or six. A total of 515 birds were banded."

PORTLAND, MAINE—MR. ARTHUR H. NORTON. "On February 28 fifty or more finches were observed in South Portland. During the next few days equal numbers were observed in Portland and Brunswick. A heavy snow storm on March 12–13 forced the birds to congregate at the bare spaces opened for human transportation and at bird feeders. The birds increased regularly and the maximum population was reached March 15 to April 10. When the snow melted they gradually dispersed and were not noticeably abundant after the middle of April."

BAR HARBOR, MAINE—MRS. EFFIE A. ANTHONY. Hundreds of finches arrived in conjunction with the blizzard of March 12–13. On March 18–19, 135 birds banded, but the birds began to die in such numbers that banding was stopped

until March 25. A total of 191 birds was banded but this represents only a small part of what could have been banded under more favorable circumstances. At least a thousand finches were present March 14 accompanied by siskins and crossbills. A second snow storm April 8 caused another minor influx. The vagrant finches were around in numbers until April 11 when the migrants began to arrive.

PRESQUE ISLE, MAINE—MR. GLENN D. CHAMBERLAIN. "We had no unusual influx last winter. The birds were here and some were banded but the fabulous reports of birds settling down in backyards by the thousands can definitely not be matched in this section. In 1939, 51 birds were banded from March 27 to April 18, three less than the number banded in 1928, the only other year when the birds arrived early and in numbers."

WOLFEVILLE, NOVA SCOTIA—MR. ROBIE W. TUFTS. "Several birds were observed February 23 and 24 and several flocks on March 4. By March 25 there were small detached flocks of 10–25 at frequent intervals, several hundred being seen in one day."

HANOVER, NEW HAMPSHIRE—DR. RICHARD WEAVER AND MEMBERS OF THE DARTMOUTH NATURAL HISTORY CLUB. The finches arrived on or near the 13th of February in small flocks of 5 or 6 and increased rapidly to flocks of 20–25 and eventually to flocks of 200–300. The first ones to be banded were caught February 20 and by February 26, 125 birds had been banded. Many of them received white tail plumes. From February 27 to March 10, 675 more were caught and these received yellow tail plumes as well as the regular bands. Green plumes were used on the birds caught from March 13–30 and red plumes were used March 31 to April 19. The peak of the banding occurred in Hanover about March 6 and from then until April 28 when the last one was banded, a gradual decrease occurred. A noticeable exodus was noted, however, the last week of April and by the end of the month the vagrants were gone and the migrants began to arrive.

DURHAM, NEW HAMPSHIRE—MRS. MAUDE N. BISBEE. The first Purple Finch arrived February 20 and was banded. On March 11–18 the peak of the invasion was reached. 171 birds were banded during and following the heavy snowstorm of March 12–13. A total of 350 birds were banded during the invasion.

MANCHESTER, NEW HAMPSHIRE—REV. EUGENE J. GOELLNER. The first evidence of the unusual invasion occurred March 2 when ten birds were seen and on March 3 when ten more were observed. On March 7 and 9 nearly three hundred were counted. On March 10 the first one was banded and by the end of the month 168 were marked. Only 95 were caught in April. The peak of the invasion was reached March 7–18.

SANBORNTON, NEW HAMPSHIRE—MR. E. C. WEEKS. The finches arrived March 20 and 11 were banded during the month.

WILLIAMSTOWN, MASSACHUSETTS—MRS. E. CROSBY DOUGHTY. Purple Finches came in hundreds from March 2 to April 16. A few were still present in May and some nested. Several hundred were banded during the first two weeks of April.

AMHERST, MASSACHUSETTS—MRS. FREDERIC MORSE CUTLER. Only one bird was banded in January and one in February. From 10 to 50 birds were banded daily during March, starting on the 9th. Birds were present in undiminished numbers during most of April but only two were banded in May. The majority of the birds banded were trapped in the period from March 10–17.

NORTHAMPTON, MASSACHUSETTS—MRS. CHRISTABEL S. ROCKWOOD. Finches were first banded March 12 when 44 birds were caught. Banding was fairly regular through March and early April, becoming less so about April 14. It continued until May 12. A total of 570 birds were banded. "The Biological Survey did a wonderful job in replenishing the supply of bands."

ATHOL, MASSACHUSETTS—MR. ROBERT ALLISON. A great many birds were banded during March and April and many returns were captured. Many of the Athol birds were recaptured elsewhere.

WESTFIELD, MASSACHUSETTS—MR. CHARLES L. HILDRETH. The first Purple

Finches were banded March 26. 26 birds were banded during March and April.

NORTH ANDOVER, MASSACHUSETTS—MR. OSCAR M. ROOT. The first of 85 birds was banded March 15 and the last on March 18. Some were still present in April and May, however, since 15 more were banded from April 29 to May 23 when banding operations were resumed.

LYNN, MASSACHUSETTS—MR. WILLIAM ARTHUR MARCY. The first birds were observed on March 9. Banding began March 11. 18 birds were banded during the month and only six more were added in April.

GROTON, MASSACHUSETTS—MR. EDWIN MASON, WHARTON BIRD BANDING STATION. On February 28 there were 13 birds about the station for a short time. Small flocks stopped each day until March 4–5 when 300 appeared. Banding was started March 7. Of the 1,123 finches banded, the majority were caught March 11–15. The number of new birds captured thereafter decreased steadily until April 27 when the last of 11 birds was trapped.

CONCORD, MASSACHUSETTS—MRS. M. A. BOWERS. "There were not many Purple Finches here in January, 1939 when we banded but 4 birds, nor in February when only 5 more were added, but in March we banded 1,125 and in April 736. From May to October 1, 1939 we added 119 more. We estimated by counting groups of 50 and comparing it with the whole number, that we had from 250–300 birds here at one time for a number of days. We used 200 pounds of sunflower seed during March. With the trapping of foreign finches we found some poorly applied bands and I wish banders might be urged to use proper pliers in doing the work." This station banded the largest number of birds during the invasion.

BELMONT, MASSACHUSETTS—MESSRS. SAMUEL D. AND CHANDLER S. ROBBINS. The first birds were observed on February 25 when a small flock appeared. Normally there are a few present each winter. On March 5, forty-two were counted on an all-day census in the Sudbury Valley and Essex County. The first bird trapped was on March 8. The birds remained in numbers until May 3. March 12–18 was the period of greatest abundance. A total of 1,665 birds were banded during the invasion.

HAMDEN, CONNECTICUT—MR. H. L. HUTCHINS. 539 Purple Finches were banded in 1939. During the six years previously only seven were caught. Banding began on March 3, 1939 and continued to May 2 with the peaks being reached March 11–13 and March 17–18. The majority of the birds were banded in the period from March 9–20.

FAIRFIELD, CONNECTICUT—DR. ARETAS A. SAUNDERS. "Although finches are usually present here in winter, they were not seen until February 25 in 1939 when a flock of ten was observed. A still larger flock was seen February 27. Thereafter, they were seen fairly regularly, but at first not in large numbers. The big flocks and the spread of the birds to many places took place March 12 and from then until about March 17 the birds seemed to be everywhere that there were trees and shrubbery. A slight decrease was evident in numbers after March 17 but they were still present generally until March 29. After this date they had decreased sufficiently to be somewhat local in distribution. Flocks were in certain definite localities all through April and up to about May 11. After that a few remained and were summer residents. During the height of the invasion flocks with as many as 200 birds were observed and they were scattered through Fairfield, Bridgeport, Stratford, Norwalk, Hartford, and Westport."

HARTFORD, CONNECTICUT—MR. C. HAPGOOD PARKS. The first Purple Finches to be observed were seen March 4 and the last one on April 29. Of the 786 birds banded by Mr. Parks, 653 were caught in Hartford and 113 were caught at Winchendon, Massachusetts. Banding of finches was started March 4 but the main increase began March 10 and lasted nearly a week. Banding during March and April fluctuated but averaged higher in late March and early April than during late April.

BRADFORD, RHODE ISLAND—MRS. MARY K. SOUTHWICK. Fifteen to twenty Purple Finches were present during January and February. On March 1 the numbers increased and by March 5 there were 50–60 birds and on March 6 at

least 100 present. From March 8–11 at least 700 birds were present. During the snowstorm on March 12, 900 or more flocked to the feeding places. Great numbers were reported all over Rhode Island. On March 12 at Winnapaug, it was estimated that at least 1000 were feeding.

EAST PROVIDENCE, RHODE ISLAND—SETH G. JAMESON. The arrival date was March 9. A daily increase occurred until March 12 when 150 birds were counted. There were at least one hundred present during the following thirty days. By April 30 only five or six could be counted.

PROVIDENCE, RHODE ISLAND—MRS. ALICE HALL WALTER. Twenty-five to one hundred birds were present regularly at five localities in the city during March and April.

LARCHMONT, NEW YORK—MRS. HENRY DOEPEL. Fourteen birds were counted during the first week of March and they were present regularly thereafter until April 21 when the last one was observed.

HUNTINGTON, NEW YORK—MR. GEOFFREY GILL. There were small scattered flocks of about a dozen birds within three miles of the station from mid-February to early May. No trapping was done but in 20 years they were never as common as in 1939.

SCARSDALE, NEW YORK—MR. GEORGE DOCK. A few scattered finches were seen as early as February 20 but no unusually large flocks were seen until early March. The first one was trapped March 12 during the snowstorm. The largest concentration occurred between March 18–29. Only sixteen birds were banded. The finches were more abundant in 1939 than in any of the three previous winters and were less common at Scarsdale than across the river in northern New Jersey.

ELMHURST, LONG ISLAND, NEW YORK—MRS. MARIE V. BEALS. A small number of birds were banded but it was the first time that any were ever caught in the spring at this station. On March 14 there were 14 birds banded. Several others were banded March 15–17.

MANORVILLE, LONG ISLAND, NEW YORK—MR. GILBERT S. RAYNOR. The first birds were banded March 13. Eighty-five others were observed and a few were banded at or near the station during the rest of March.

ALBANY, NEW YORK—DR. DAYTON STONER. "The finches seemed to reach the greatest abundance in 1939 during May and were present earlier but not in the usual numbers. Apparently the invasion was more conspicuous to the east of us."

PEQUANNOCK, NEW JERSEY—MRS. MARIE DUMONT. Although only six birds were banded, there was only one other bird that visited the traps in six years of banding.

MONTCLAIR, NEW JERSEY—MRS. CHARLES S. HEGEMAN. The first bird was observed March 15. The first one to be banded was caught March 23 and the last one May 4. A total of 91 birds was reached for the period of the invasion. They were well distributed all over Montclair.

BOONTON, NEW JERSEY—MRS. IRENE D. SWART. Banding started March 1 and by March 15, 160 birds were banded and by March 31, 352 more. In April, 325 were banded during the first half of the month and 222 during the latter half. In May only 37 birds were added, the last one on May 6. The total for the invasion was 1,091.

DEMAREST, NEW JERSEY—MR. B. S. BOWDISH. The first two birds were banded on March 10. They continued to arrive through March so that the major part of the 661 banded were caught during the month. Forty-six were banded on April 15, however, more than on any day in March. The last one was banded May 7 and the last repeat recorded on May 8.

ARDMORE, PENNSYLVANIA—MR. HORACE GROSKIN. A total of 1,146 birds was banded in the period from February 10 to May 16 with the peak of the invasion reached March 17–31. However, the birds were present in large numbers during the period of March 30 to April 14 and they did not decrease noticeably until after May 1. Not over 50 birds were banded during any week until after March 17. Of the 1,146 birds banded, 450 or about 39% were adult males and 696 or about

60% were olivaceous females or immature birds. This is contrasted with the fall migration of 1939 and 498 birds were banded and only 10% were adult males. Four of those banded in the spring invasion were retaken during the fall migration.

CHESTNUT HILL, PENNSYLVANIA—MR. JOHN DORMAN. A total of 297 finches was banded during the invasion compared with 100 during 1938.

WYNCOTE, PENNSYLVANIA—MR. WILLIAM PEPPER, JR. A total of 113 birds was banded in 1939, a larger number than ever banded before. The first one was caught March 18 and the last one repeated May 6. The height of the wave was reached April 2 and 3.

MORRISVILLE, PENNSYLVANIA—MR. RANDOLPH ASHTON. Finches arrived March 3 and were seen occasionally up to March 12 when about 30 birds arrived, increasing to 50 by March 13. About 20 birds remained during March and then decreased during April until the 17th when no more were seen.

LACEYVILLE, PENNSYLVANIA—MR. CHARLES C. VANDERVORT. Purple Finches were first recorded April 18 and last seen May 6.

CHESTNUT HILL, PENNSYLVANIA—MR. A. M. CLARK. The finches were regular during the fall of 1938 but increased noticeably after December 26, becoming more numerous than in any previous year. There were 10 or 12 feeding regularly at each feeding shelf. On February 5 fifty birds arrived and the numbers gradually increased thereafter reaching over 100 by April 8, which was evidently near the peak of the invasion. The numbers decreased rapidly after that. Mid-March to April 25 covered the period of the invasion proper although several birds were observed as late as May 7.

SWARTHMORE, PENNSYLVANIA—DR. C. BROOKE WORTH. Only a few birds were observed near the end of March and early April and none entered the traps. It was their first appearance at the station. Many were observed during this period at Wayne, Pa.

Other banders in the Philadelphia region who banded a few finches during this period were Horace D. McCann of Paoli, Raymond J. Middleton of Norristown, Mr. and Mrs. John Gillespie of Glenolden, and H. P. Bailey of Overbrook.

RATE OF TRAVEL

The rate of travel was determined in miles per day for about 40 of the returns of birds banded and retaken during the invasion. An attempt was made to segregate the results into time or distance groups to see if the birds were traveling faster at any one time during the invasion or if the birds taken a short distance away from the place of banding were traveling any faster than those taken at longer distances. However, distance traveled made little or no difference on the rate of speed but those banded in February and early March averaged 3.54 miles per day while those banded the latter part of March and early April average 9.26 miles per day.

The general rate of speed of the birds during the invasion regardless of distance or time was approximately 7–8 miles per day. The greatest rate of speed was of a bird banded at Ardmore, Pa., March 29 and recaptured May 1 at Sault Ste. Marie, Mich., which is an average of approximately 20 miles per day. Other returns showing a rather rapid rate of speed were as follows:

39-155079 banded at Wyncote, Pa., March 18 and recaptured at Concord, Mass., April 8, an average of 11.36 miles per day.

38-57963 also banded at Wyncote, Pa., April 8 and recaptured at Conway, Mass., April 25, making an average of 11.1 miles per day.

138-563 banded March 18 at Athol, Mass., was retaken at Ardmore, Pa., on April 4, which makes an average of 14.7 miles per day.

The following chart shows the average rate of speed of birds banded and recovered during the invasion, arranged in fifteen day intervals:

Feb. 15–28	*Mar. 1–15*	*Mar. 16–31*	*April 1–15*	*April 16–30*	*May 1–June*
No. of birds		*Average*			
1		5.41			
2				2.2	
	2	4.98			
	8		3.46		
	3			1.93	
					AVERAGE 3.54
		2	10.3		
		8	6.51		
		2		10	
		2			12.2
			4	7.8	
					AVERAGE 9.26

MORTALITY

Not a great amount of significant data were obtained regarding the deaths of Purple Finches during the 1939 invasion. The following notes were the only contributions:

Purple Finches suffered slightly from the depredations of predators, ten to twelve cases being reported. Sharp-shinned and Sparrow Hawks were mentioned as predators in two instances but cats topped the list as the principal enemy.

Several birds collided with the windows of houses and automobiles and were killed. About six such instances were reported.

In several localities, mostly in Maine, many birds were found dead or dying. These places were: Bangor, Millbridge, Albion, Bar Harbor, and Orono, Maine and St. Johnsbury, Vermont. A letter from Mrs. Webb of Albion gives the following interesting account of the mortality around her home. She says:

"While the number of finches killed is a matter of conjecture, there is no doubt that many were killed when they flocked around houses of the towns in such numbers to take food offered to them. Their extreme tameness made them easy prey for cats. Several of the people in town told me of their cats catching many finches in spite of their precautions. Three were killed by automobiles in front of my house. It was my habit to keep the family cat in the house during the day and allowing her to go out for a short time after dark. Two nights in succession the cat appeared with a bird. The first one I took for granted to have been found dead, but on watching her the second night I discovered she was prowling along close to the house foundation. With the aid of a flashlight I found two birds huddled against the house sleeping. I confined them overnight in a cage and released them in the morning. During the day I noticed a finch being pecked and pushed around by the other birds so I captured it easily, and found it to be one of those I had taken the previous night. It seemed feeble so I placed it in a cage where it lived two days. This bird and another found at night were sent to Harvard University where an examination disclosed extreme emaciation in both cases, one bird showing congestion of the lungs, cloudy swelling of the

kidneys and cranial hemorrhage. For several nights I searched the crevices between the snowbank and the house foundation and found two other birds. A bird was found asleep on the stone door step early in the morning and another on the floor of the garage where it had apparently taken shelter the night before. Once or twice previous to the discovery of these finches I had noticed feathers around the yard in the morning so prowling cats must have accounted for others. I have definite knowledge of fifteen birds killed. The cause of the deaths were. cats—8, automobiles—3, illness—2, found dead, cause unknown—2."

Harvard Medical School also examined one bird sent to them by Mr. Wendell P. Smith of Wells River, Vermont. The report was "pulmonary congestion, possibly pneumonic condition."

Eighteen birds were examined by Dr. C. M. Aldous of the Wildlife Research Unit at Orono, Maine. He reported the birds had a blood parasite, microfilaria, and showed no signs of starvation or freezing.

At Bar Harbor, Mrs. Effie A. Anthony writes that after the blizzard of March 13 when hundreds of the birds arrived, many began to starve and freeze to death, so much so that she discontinued banding and spread seed in every possible place for the birds. The worst period was about five or six days after the storm.

ACKNOWLEDGMENTS

The author wishes to express his sincere appreciation to all those who so generously contributed their time, their records, and their interest, which made this summary of the 1939 Purple Finch invasion possible. Many of the banders and observers who contributed have been recognized in the context but there were many others not mentioned who helped greatly by making individual sight observations of plumed birds, by indicating the absence of the birds in their areas, and by making detailed compilations of their banding data.

The author is especially grateful to Mrs. Florence Weaver, Mrs. Louise Forsyth, Mr. Clinton Reynolds and Mr. Flagg Southerland for giving so much time and assistance in the pluming and banding activities at Hanover, N. H. and for assisting in the preparation of the manuscript.

REFERENCES

BAGG, AARON CLARK AND SAMUEL ATKINS ELIOT, JR.
Birds of the Connecticut Valley in Massachusetts. 1937: 741–744.

BAIRD, S. F., T. M. BREWER AND R. RIDGWAY.
A History of North American Birds. Land Birds, Vol. I. 1875: 462–464.

BIRD LORE MAGAZINE.
National Association of Audubon Societies.
Christmas Censuses.

BULLETIN OF NEW ENGLAND BIRD LIFE.
New England Museum of Natural History.
Monthly Reports.

CHAPMAN, FRANK M.
Handbook of Birds of Eastern North America. (1912) 1927: 377–378.

Forbush, Edward Howe.
Birds of Massachusetts and Other New England States. Vol. III. 1929:10–13.
Lincoln, Frederick C.
Returns From Banded Birds 1923–1926. Tech. Bull. No. 32, U.S.D.A. 1927: 5, 48.
The Migration of American Birds. 1939: 48, 96, 103, 139, 144, 159.
Macoun, John and James M. Macoun.
Catalogue of Canadian Birds. 1909: 453–455.
Minot, H. D.
The Land and Game Birds of New England. 1895: 179.
United States Biological Survey.
Bird Banding Notes 1932–1939.
Bird Banding Returns 1938–1939.

Dartmouth College, Hanover, New Hampshire.

A RECORD OF BIRDS BANDED AT AVERY ISLAND, LOUISIANA DURING THE YEARS 1937, 1938 AND 1939

By E. A. McIlhenny

Foreword

In Bird Banding, No. 3, July, 1937, there was published a complete list of the birds banded by me at Avery Island, Louisiana during the year 1936. The number banded that year being 17,981, enumerated as far as possible as to sex. Since then, I have received, from time to time, from others interested in bird banding and the sex ratio of birds, requests for information similar to that given for 1936. I now present a tabulation of the birds banded at my station for the years 1937, 1938, and 1939. A comparison of these records with that for 1936 gives some interesting data as to numbers banded and sex ratio. My banding traps for the smaller land birds are operated every day in the year, and my four traps for migratory wild fowl are operated from September 1st to February 1st; then closed until March 15th., at which time one trap is operated on Blue-winged Teal (*Querquedula discors*), as their return from the south can be expected about that time.

My reason for closing the wild fowl traps in mid-winter is, that the great majority of wild fowl using the territory adjacent to the traps have been banded by that time. These banded birds, knowing grain is available in the traps, crowd into them as soon as the feed is spread in the morning, making it necessary to handle many hundreds of banded birds in order to get a few that are not banded. This also seems to be true of the Red-wings (*Agelaius phoeniceus littoralis*) and Boat-tailed Grackles (*Cassidix mexicanus major*) taken in my small bird traps, as these traps take more banded birds during the summer than those not banded.

Small birds seem to have more shrewdness in getting out of the traps than wild fowl, for they, after feeding in the trap, will fly up and out the same opening they entered by. Ducks, on the contrary stay in the traps until liberated.

Coots (*Fulica americana americana*) are the wisest of all the birds I have banded. They stay in the water to the lee of the trap, and eat such food as is floated out by the wind or splashed out by the feeding ducks. Very few coots enter the traps at one time, and then only in small groups; these, after having fed, go out without hesitation through the apex of the entrance funnel, and their place is taken by another small group. This in and out of the trap by Coots in small parties is continuous until all are fed, or all the food in the trap is consumed.

Black Vultures (*Coragyps atratus atratus*) are the most interesting and individual of the birds that I band, and by far the easiest to get into the trap. I band Vultures only during late February and the first week of March in the spring, and late October to November 15th, in the autumn. The spring banding begins after the fur-trapping season ends in February, and closes when the Vultures begin nesting in March. The fall banding begins in late October, one month before the fur-trapping season begins in November, and ends on November 20th. During the trapping season for fur animals, Vultures feed on the carcasses of the animals killed for their skins, and scatter over a wide area of marsh and woodland to get this food. After the trapping season, they again take up their abode in the great Vulture roost in the forest on the east side of Avery Island. The large population of this roost can be appreciated when it is realized I use only one trap for these birds and it is set only two months each year, yet the total Vultures banded during the three years here listed total 8,046 Black Vultures, and I have recorded more than 3,000 retraps of individuals who have been banded for more than one year. Turkey Vultures (*Cathartes aura septentrionalis*), although common, do not go into the trap with the Black Vultures.

These birds seem to know days ahead of the time the vulture trap is to be set, and for a week or more before that time gather daily at the trap, perching on top and going inside, as if expecting food to be place for them. If the trap was not kept open, hundreds of Vultures would go into it and starve, as no one visits the trap except when it is set. An abundance of interesting facts have been noted concerning this bird since I started banding them.

During the exceptionally cold January and February just passed, I developed a method of catching Woodcock (*Philohela minor*) at night, using a headlight and net. I found the method was also effective in capturing other ground roosting birds, and have succeeded in netting and banding many species I had not before banded.

Night banding is exciting as well as interesting, and in the future it will play a large part in my banding operations.

Systematic records and observations of banded birds develop three main facts: migration, span of life, and homing ability—facts that could not possibly be learned through any other source.

During the three years here recorded, I banded a total of 81,593 birds divided as follows:

Wild fowl and Game Birds	55,533
Non-game Birds	26,060

During this period I have recorded more than 7,000 returns and re-traps from birds making one or more migrations after being banded.

The recording of returns of a large number of individuals of a species that have been banded at one station over a period of years, gives an accurate picture of the migration and distribution of that species. A record that could not have been made except by the retaking of the banded birds. A graph of the retakes of birds banded at Avery Island, which is located about the south center of the Mississippi Valley flyway, shows birds banded at this point have been retaken throughout the northern part of North America from Newfoundland on the east to the coast of Bering Sea on the west. Very few naturalists have had the opportunity to follow the migration of our birds from their winter home in the south to the place far north where they are at home in the summer. The retaking of recorded banded birds enables us to readily grasp the whole picture of distribution and migration of many species, which have been banded in sufficient numbers at one station over a long period of time. It requires many years of careful records to build such a picture, but when built, it is permanent and accurate.

A comparison of the sex ratio of the birds banded is interesting and shows but little variation in percentage for the three years here given, when compared with the record for 1936. The sex ratio determined while banding trapped birds cannot be absolutely accurate, for too many errors occur because of the different migration of the sexes and the habit of some birds of flocking in winter according to sex; notably, Red-wings (*Agelaius phoeniceus littoralis*), Cow-birds (*Molothrus ater ater*) and grackles of the various species coming to Louisiana.

Banding does indicate when the records of one station are compared for a number of years, whether one sex is more abundant than the other.

In all the species of ducks I have banded in large numbers, excepting only the Mallard (*Anas platyrhynchos platyrhynchos*), males outnumber females about two to one. The over abundance of males is undoubtedly one of the governing factors in the decrease of the duck population.

As all of my traps are large stationary wire-covered enclosures, and as I use only one sort of food to attract the birds, and that—cracked rice—(except, of course, for Vultures), I do not get a very wide variety of birds in the traps, other than grain-eaters. Some few insectivorous birds blunder into the traps, but these are exceptions. I have, however, during the years here tabulated, banded 87 different species.

During the three years banding now recorded, a very large number of returns have been noted, some banded as much as ten years back. During several winters, I kept a record of the numbers of times the same bird was taken in the trap, and find many ducks are recorded as retakes very many times for the entire winter-banding season. These old-timers become very tame, and do not struggle when being handled. Some ducks have been retaken many times each year for four or more years.

A LIST OF BIRDS BANDED BY E. A. McILHENNY AT AVERY ISLAND, LOUISIANA DURING THE YEARS 1937, 1938, and 1939

SPECIES			*1937*	*1938*	*1939*
Pied-billed Grebe		(*Podilymbus podiceps podiceps*)	15	9	4
Water-Turkey		(*Anhinga anhinga*)	0	1	6
Great Blue Heron		(*Ardea herodias herodias*)	1	0	0
American Egret		(*Casmerodius albus egretta*)	0	2	0
Snowy Egret		(*Egretta thula thula*)	112	302	29
Louisiana Heron		(*Hydranassa tricolor ruficollis*)	1	122	24
Little Blue Heron		(*Florida caerulea caerulea*)	6	34	0
Yellow-crowned Night Heron		(*Nyctanassa violacea violacea*)	4	0	0
American Bittern		(*Botaurus lentiginosus*)	0	0	2
Glossy Ibis		(*Plegadis falcinellus falcinellus*)	16	0	0
Lesser Snow Goose		(*Chen hyperborea hyperborea*)	10	0	0
Blue Goose		(*Chen caerulescens*)	132	205	11
Fulvous TreeDuck	(♂)	(*Dendrocygna bicolor helva*)	10	7	0
" " "	(♀)	(" " ")	5	0	0
Mallard	(♂)	(*Anas platyrhynchos, platyrhynchos*)	552	907	861
"	(♀)	(" " ")	534	895	771
Common Northern Black Duck	(♂)	(*Anas rubripes tristis*)	14	3	0
" " "	(♀)	(" " ")	4	3	0
Mottled Duck	(♂)	(*Anas fulvigula maculosa*)	118	74	13
" "	(♀)	(" " ")	63	33	14
Gadwall	(♂)	(*Chaulelasmus streperus*)	0	3	19
"	(♀)	(" ")	1	3	13
Baldpate	(♂)	(*Mareca americana*)	0	3	16
"	(♀)	(" ")	3	0	10
American Pintail	(♂)	(*Dafila acuta tzitzihoa*)	3,855	4,916	5,207
" "	(♀)	(" " ")	2,052	2,186	2,178
Green-winged Teal	(♂)	(*Nettion carolinense*)	75	181	299
" " "	(♀)	(" " ")	29	63	172
Blue-winged Teal	(♂)	(*Querquedula discors*)	1,887	1,450	1,380
" " "	(♀)	(" " ")	1,069	639	534
Cinnamon Teal	(♂)	(" *cyanoptera*)	12	3	2
" " "	(♀)	(" ")	1	0	0
Shoveller	(♂)	(*Spatula clypeata*)	3	4	14
"	(♀)	(" ")	1	0	9
Wood Duck	(♂)	(*Aix sponsa*)	202	149	81
" "	(♀)	(" ")	145	97	43
Redhead	(♂)	(*Nyroca americana*)	26	8	6
"	(♀)	(" ")	16	4	3
Ring-necked Duck	(♂)	(*Nyroca collaris*)	1,302	1,284	2,899
" " "	(♀)	(" ")	486	388	835
Canvasback Duck	(♂)	(" *valisineria*)	151	176	102
" " "	(♀)	(" ")	86	97	71
Greater Scaup Duck	(♂)	(" *marila*)	4	9	3
" " "	(♀)	(" ")	3	8	5
Lesser Scaup Duck	(♂)	(" *affinis*)	1,750	2,790	1,493
" " "	(♀)	(" ")	943	1,067	747
Buffle-head	(♂)	(*Charitonetta albeola*)	3	0	1
" " "	(♀)	(" ")	2	0	0

A LIST OF BIRDS BANDED BY E. A. McILHENNY AT AVERY ISLAND, LOUISIANA DURING THE YEARS 1937, 1938, and 1939 (Concluded)

SPECIES		*1937*	*1938*	*1939*
Ruddy Duck (♂)	(*Erismatura jamaicensis rubida*)	18	8	1
" " " (♀)	(" " " ")	20	4	0
Hooded Merganser (♂)	(*Lophodytes cucullatus*)	4	0	0
" " " (♀)	(" " ")	1	0	1
American Merganser	(*Mergus merganser americanus*)	2	0	0
Black Vulture	(*Coragyps atratus atratus*)	2,388	2,456	3,220
Cooper's Hawk	(*Accipiter cooperi*)	0	3	0
Bald Eagle	(*Haliaeetus leucocephalus leucocephalus*)	1	0	0
Eastern Sparrow Hawk	(*Falco sparverius sparverius*)	1	1	1
Eastern Pigeon Hawk	(" *columbarius columbarius*)	0	0	1
Eastern Bob-white (♂)	(*Colinus virginianus virginianus*)	97	7	26
" " " (♀)	(" " " ")	61	4	12
Sora	(*Porzana carolina*)	0	2	0
Purple Gallinule	(*Ionornis martinica*)	12	4	14
Florida Gallinule	(*Gallinula chloropus cachinnans*)	666	241	213
American Coot	(*Fulica americana americana*)	1,107	938	1,007
Black-neck Stilt	(*Himantopus mexicanus*)	0	0	3
Killdeer	(*Oxyechus vociferus vociferus*)	1	4	1
Eastern Mourning Dove	(*Zenaidura macroura carolinensis*)	35	3	10
Yellow-billed Cuckoo	(*Coccyzus americanus americanus*)	0	2	0
Barn Owl	(*Tyto alba pratincola*)	0	1	0
Southern Screech Owl	(*Otus asio asio*)	1	0	5
Great Horned Owl	(*Bubo virginianus virginianus*)	0	0	1
Chimney Swift	(*Chaetura pelagica*)	397	130	340
Ruby-throated Hummingbird	(*Archilochus colubris*)	0	1	1
Southern Flicker	(*Colaptes auratus auratus*)	12	2	1
Red-bellied Woodpecker (♂)	(*Centurus carolinus*)	3	7	6
" " " (♀)	(" ")	1	5	5
Kingbird	(*Tyrannus tyrannus*)	0	3	1
Eastern Phoebe	(*Sayornis phoebe*)	0	0	2
Tree Swallow	(*Iridoprocne bicolor*)	243	65	30
Bank Swallow	(*Riparia riparia riparia*)	32	0	33
Rough-winged Swallow	(*Stelgidopteryx ruficollis serripennis*)	0	31	14
Barn Swallow	(*Hirundo erythrogaster*)	0	2	0
Purple Martin	(*Progne subis subis*)	5	0	0
Florida Blue Jay	(*Cyanocitta cristata florincola*)	64	89	86
Fish Crow	(*Corvus ossifragus*)	165	22	0
Carolina Wren	(*Thryothorus ludovicianus*)	0	3	1
Eastern Mockingbird	(*Mimus polyglottos polyglottos*)	141	103	163
Brown Thrasher	(*Tozostoma rufum*)	10	44	39
Southern Robin	(*Turdus migratorius achrusterus*)	0	0	10
Loggerhead Shrike	(*Lanius ludovicianus ludovicianus*)	32	28	21
Starling	(*Sturnus vulgaris vulgaris*)	42	208	375
Myrtle Warbler	(*Dendroica coronata*)	2	3	5
Bobolink	(*Dolichonyx oryzivorus*)	0	0	4
Western Meadowlark	(*Sturnella neglecta*)	56	118	96
Yellow-headed Blackbird	(*Xanthocephalus xanthocephalus*)	5	1	0
Gulf Coast Red-wing (♂)	(*Agelaius phoeniceus littoralis*)	1,700	1,607	2,102
" " " " (♀)	(" " " ")	393	259	331
Rusty Blackbird (♂)	(*Euphagus carolinus*)	6	0	31
" " " (♀)	(" ")	0	0	1
Brewer's Blackbird	(" *cyanocephalus*)	2	0	0
Boat-tailed Grackle (♂)	(*Cassidix mexicanus major*)	299	519	512
" " " (♀)	(" " ")	1,052	909	1,002
Great-tailed Grackle (♀)	(" " *mexicanus*)	0	0	4
Purple Grackle (♂)	(*Quiscalus quiscula quiscula*)	264	8	91
" " (♀)	(" " ")	89	0	61
Florida Grackle (♂)	(" *quiscala aglaeus*)	10	9	0
" " (♀)	(" " ")	3	6	0
Bronzed Grackle (♂)	(" " *aeneus*)	29	0	3
" " (♀)	(" " ")	25	0	1
Eastern Cowbird (♂)	(*Molothrus ater ater*)	315	125	862
" " (♀)	(" " ")	162	39	247
Louisiana Cardinal (♂)	(*Richmondena cardinalis magnirostris*)	76	67	77
" " (♀)	(" " " ")	31	36	85
Dickcissel	(*Spiza americana*)	0	0	2
Red-eyed Towhee	(*Pipilo e. erythrophthalmus*)	1	0	0
Eastern Savannah Sparrow	(*Passerculus sandwichensis savanna*)	241	59	165
Swamp Sparrow	(*Melospiza georgiana*)	0	3	45
Hybrid Canvasback and Redhead Drake		1	0	0
Hybrid Cinnamon Teal and Shoveller Drake		1	0	0
Pintail and Redhead (♂)		0	0	1
" " " (♀)		0	0	1
		26,029	26,314	29,250

Avery Island, Louisiana.

GENERAL NOTES

Notes on Duck Recoveries.—The banding recoveries given below are those received from the Biological Survey during 1937 and 1938. All these ducks were banded at Montcalm Farms, Phoenixville, Pa.

Mallard (*Anas platyrhynchos platyrhynchos*):

662640, banded August, 1932, was shot October, 1937, near Port Clinton, Ohio.
644591, banded December 24, 1936, was shot October 9, 1937, near Freemont, Ohio.
644573, banded October 25, 1936, was shot November 2, 1937, at Weaver, Minnesota.
644520, banded November 9, 1935, was found dead July 28, 1938, at Kimberton, Pennsylvania.
644576, banded October 25, 1936, was shot October 28, 1938, at French Creek, Chester County, Pennsylvania.

Black Duck (*Anas rubripes*):

644918, banded February 26, 1937, found dead about February 7, 1938, at Indian Head, Maryland.
541898, banded January 22, 1935, taken June 27, 1937, at Attawapiskat, Ontario, by an Indian.
644286, banded December 14, 1936, killed about November 9, 1937, at Paulsboro, New Jersey.
644164, banded December 24, 1935, shot on November 26, 1937, on the Schuylkill River near Valley Forge, Pennsylvania.

The Mallards show a much greater tendancy toward a westward movement while the Black Ducks in these few recoveries were all either north or south of the place of banding.—FRANK B. FOSTER, Phoenixville, Pa.

Return Records of a Scarlet Tanager (*Piranga erythromelas*).—Although I have banded only fifteen Scarlet Tanagers, I have had returns on two of them.

A-286073, ♂, banded in Montvale, July 2, 1931 and retrapped July 9, 1931. Returned on May 18, 1932 and was not retrapped that year. Returned on May 19, 1933 and was retrapped on August 21, August 22, and August 26.

Returned on May 12, 1934 and was not retrapped that year. Returned on May 13, 1935, and retrapped twice on May 15, three times on May 16, once on May 17 and on May 18 it was in the trap so many times that I finally left the trap open. The bird was in and out of the trap several times a day until July 20 as it was feeding a couple of young ones. It stopped going to the trap on that date so I reset it and caught the bird again on July 28, August 1, August 2, and August 18. Since that time I have not retrapped it.

B-221324, ♂, banded on July 31, 1932 was found dead in Montvale on May 25, 1933.

It is rather remarkable that the first bird returned so close to the same date and always went into the same trap. I also noticed that it kept the young ones at least twenty-five feet from the trap and seemed to want them not to be caught.

One reason that I do not trap so many of these birds is that many of my neighbors have become bird minded and keep suet out all the time. This, plus the fact that they have large and tall oak trees has made the birds remain in their territories. I have seen bands on some of these birds but of course could not get any information. They are around my station too, but I can manage to trap only about one each year.—CARL A. PEDERSEN, Montvale, N. J.

Notes on Returns of the Eastern Purple Finch (*Carpodacus purpureus purpureus*), **and their Sex Ratio.** To review my records on the sex of Purple Finches is not a simple matter. Males do not begin to assume the crimson plumage until a year old. In the spring, young males are in their brownish plumage and cannot be positively separated from the females. After molting, young-of-the-year and adult females are similar and cannot be separated. During the molting season adult females can be separated from young-of-the-year as they molt their wing feathers, the young not doing so. Large numbers of Finches are banded every year that, at the time of banding, cannot be separated as to sex. Many of these birds return and can then be determined as to sex. I believe the most reliable sex ratio for this species can be obtained by studying returns. I have, therefore, checked all my returns on Finches banded since I started banding them in 1922 to the end of 1938, 17 years, as follows: Number banded in this seventeen-year period 21,715. The returns numbered 1,746. Of these 139 could not be separated as to sex, and, of the balance 922, were males and 685 females, the percentages being: Sex not known, 7.96%; Male, 52.81%; Female, 39.23%.

In studying my cards I also secured data on the number of the Finches that were at least five years or older up to time they were last trapped, as follows:

	Male	*Female*	*Returned every year from year banded to last year trapped* *Male*	*Female*
At least 5 years old	107	64	21	13
At least 6 years old	30	17	4	4
At least 7 years old	11	7	1	1
At least 8 years old	4	2	2	2
At least 10 years old	1	0	0	0
	153	90	28	20

The above list is as complete as the age can be positively determined. The males, on account of not getting their crimson plumage until a year old, furnish the most accurate data. For example: a male in crimson plumage, banded any time before molting in 1937, is at least a 1935 bird. A female, banded at the same time in 1937, is at least a 1936 bird. If year-old and second-year females could be told apart, some females that can only be determined as at least 4 years of age would be in the 5-year list, and some of the listed females might be advanced a year. During the next few years some of these birds that have returned will be back again and some banded that have not yet returned will be back. The list will be corrected from year to year and in time will have a complete record of my Finch returns for this 17-year period.

My oldest Purple Finch record is still the adult male banded in Spring of 1922, at least a 1920 bird, trapped every year but one to 1930.—M. J. MAGEE, Sault Ste. Marie, Michigan.

A Crippled White-throated Sparrow.—On January 5, 1939 on the campus of the University of Georgia at Athens, Georgia, the writer caught a White-throated Sparrow (*Zonotrichia albicollis*) that had managed to survive despite a seriously crippled right leg. The bird was taken in a modified Government Sparrow Trap along with ten English Sparrows. The right leg had been broken about a third of an inch below the ankle joint and had healed with the lower part of the leg turned inward at a right angle to its normal position. The lower part of the leg had also become twisted in healing so that the two outer toes were turned completely over. While hopping on the ground the bird relied mostly on the normal leg but the crippled one was used effectively as a support, resting on the ground from the point of fracture to the toes. The two outer toes had become swollen and the whole leg discolored from its newly acquired function.

While perching only the normal leg was used but in scrambling through the bushes the lame leg also came into use. While perching the bird frequently worked the crippled leg as though trying to use it but the break was so serious the leg remained folded beneath the body quite useless.

The only other remarkable thing about the bird was the shortness of its tail which was only about an inch long. Perhaps the tail was lost and the leg broken in the same mishap. The bird bears U. S. Biological Survey band number 39-133229.—WILLIAM CANTRELL, Department of Zoology, University of Georgia, Athens, Georgia.

Returns of Birds released away from Station.—On December 8, 1937, we banded eight Starlings; numbers 38-201641 to 48. These were released at Pompton Lakes, N. J., 3 miles northeast of station. 38-201643 was retaken two days later. On June 28, 1938 38-201648 was trapped as a return. 38-201646 was found dead in the garage in Febuary 5, 1939.

Six Starlings, numbers 38-201649 to 54 were banded the following day (Dec. 9th) and were released at Englewood Cliffs, N. J., 19 miles east of station. 38-201654 was retaken on the 10th, and with three other Starlings was released at Harrison, N. J. This is 16½ miles southeast of station. On December 24th this bird was again taken from the traps, this time being released here. It repeated on January 17, 18, and March 8, 1938. We find it very unusual for Starlings to repeat. I might add, however, we have banded comparatively few of these birds, as they are quite a nuisance and are not encouraged.

On February 4, 1939 a consignment of ten Tree Sparrows was taken from station and released at Belvidere, N. J., 46 miles west. Two of these birds were taken as returns in November of that year on return from their summer range. Records on these birds are as follows: 138–2992, banded December 14, 1938; December 31, 1938; January 1, 6, 7, 21, 22, 23, 28, 29, 31; February 2, 4, 1939. Return on November 21, 1939. 139–30517, banded February 2, 1939, February 3, 4, 1939. Return on November 20, 1939.— GUSTAVE DUMONT, JR., Dumont Banding Station, Pequannock, N. J.

RECENT LITERATURE

Reviews by Margaret M. Nice and Others

BANDING

1. Report of the Bird-Banding Committee. Progress for 1939.—A. L. Thomson. 1940. *British Birds*, 33: 318–325. A total of 55,817 birds were ringed in Great Britain in 1939, slightly more than half being trapped birds, the others nestlings. Restrictions are placed on banding many species, especially the nestlings, some because they have proved "unremunerative", others because of the wealth of information on hand. The birds banded in greatest numbers during the last 30 years are: Song Thrush, Starling, Blackbird, Swallow, Lapwing, Chaffinch, Greenfinch, Redbreast, Manx Shearwater and Common Tern. Recoveries range from 0 to 21.5% (Merlin, *Falco columbarius aesalon*). Typical recovery percentages are: Swallow, 1.0; Song Thrush, 1.9; Greenfinch, 6.8; Common Tern, 2.5; Owls, 3.4–9.3; Hawks, 4.3–21.5; Crows, 4.7; Raven, 7.0; Common Heron, 11.9; Ducks, 13.3–20.5.

Transatlantic journeys occurred in three cases in 1939: two Puffins (*Fratercula arctica*) ringed on St. Kilda were recovered in Newfoundland; a Great (or Northern) Skua (*Stercorarius s. skua*) ringed as a nestling in Shetland in 1939 was found dead near Boston, Mass., February, 1940.

2. Skokholm Bird Observatory. Report for 1939.—R. M. Lockley. 1940. 12pp. Western Telegraph, Haverfordwest. A total of 6,393 birds were ringed. It was found that with the Gannets (*Sula bassana*) the young birds range much more widely in winter than the adults. Of 216 young Cormorants (*Phalacrocorax c. carbo*) ringed in 1939 13.5% were reported shot before the end of the year.

3. The Invasion of Bohemian Waxwings in 1931-32 and 32-33. (Die *Bombycilla g. garrulus*—Invasion in den Jahren 1931–32 und 1932–33, und die Ergebnisse der Beringungsversuche.)—K. Warga. 1939. *Aquila*, 42–45 (1935–38) : 490–528. In 12 days 1371 Waxwings were banded; 54 were recovered (3.9%): 19 in or near Budapest, 22 from the interior of Hungary; 13 from Norway, Finland and Russia. Sex was distinguished by the length and breadth of the primaries; 55% of the birds were males; 79% were juvenile.

4. The Bohemian Waxwing Invasion into Hungary in 1937-38. (Die 1937–38-er *Bombycilla g. garrulus* Invasion in Ungarn.)—K. Warga. 1939. *Aquila*, 42–45 (1935–38): 535–542. Three hundred were banded. One of those banded in 1932 was retaken in 1938; it had been driven into a house by a Sparrow Hawk (*Accipiter nisus*).

5. A Study of Blue Tits by Colour Ringing.—Hugh Kenrick. 1940. *British Birds*, 33 : 307–310. One hundred and thirty *Parus coeruleus obscurus* were ringed in the author's garden with "14 different coloured rings, some plain colours, some striped." The young of each brood were banded with the same

colour; then if retrapped, the bird's origin is known and a "full set" of bands given it. Of 80 young, five were recovered in the area and one two miles away—6 and 7.5%.

A female was ringed in January, 1933. "She nested in 1933, '36, '37 and '38. When at least 6 years old she mated with a cock hatched the year before. They failed to bring off a family." Another hen had the same mate for 2 years, then when at least 5 years old, mated with a year old cock. "She deserted her eggs."

6. Banding Woodcocks on Pennsylvania Singing Grounds.—R. T. Norris, J. D. Beule and A. T. Studholme. 1940. *Journ. Wildlife Management*, 4 : 8–14. On a 950 acre tract of "pine barrens" 45 singing male *Philohela minor* were located. Singing grounds ranged in size from 5 x 12 to 47 x 54 feet, averaging 21 x 37 feet. A mounted male Woodcock was placed inside of a net trap; most of the males came to the decoys, uttering *took-oo* with their wings raised over their backs, and attempted to copulate. After a bird was caught and banded he usually resumed his singing activities within 5 minutes.

Other studies based on banding are Nos. 7–12, 15, 16, 25, 26, 28, 40 and 58.

MIGRATION

7. Migration of Black-headed Gulls in Switzerland. (Migration des Mouettes rieusses (*Larus r. ridibundus*) en Suisse.)—Ernst Sutter. 1940. *Ornithologische Beobachter*, 37 : 1–15. Black-headed Gulls that migrate through Switzerland or winter there come from central Europe to the northeast, some from as far away as Russia. Usually the gulls return to the same place to winter, arriving from August to December; some being captured 3 and 4 winters in succession. A few changed their winter quarters. The greatest age attained is at least 11½ years. Of 916 gulls ringed at Geneva returns and recoveries came to 12.69%.

8. Results on Banding German Greenfinches. (Ergebnisse der Beringung deutscher Grünfinken (*Chloris chl. chloris*) mit Berücksichtigung der Auslands-Fernfunde.)—J. Ehlers. 1939. *Shriften der Physik.-ökonom. Gesellschaft zu Königsberg (Pr)*, 71 : 145–176.—About one-third of the banded Greenfinches in Germany appear to be permanent residents; one third may go as far as 50–100 kilometers, while the rest migrate as far as southern France and northern Italy. In England Greenfinches migrate only some 100–200 kilometers. Of 410 birds taken in one winter 75 were adult males, 63 adult females, 182 juvenile males and 90 juvenile females.

9. Results from Banding Blackbirds in Silesia and Saxony. (Beringungsergebnisse schlesischer und sächsischer Amseln (*Turdus merula merula* (L.).) R. Weimann. 1938. *Ber. Ver. schles. Ornith.*, 23 : 1–14. About 30% of the Blackbirds migrate to France, the rest being permanent residents. Females migrate more than males; the young more than the adults. Blackbirds nesting in towns migrate as well as those nesting in the woods.

10. A Preliminary Report on Some Experiments on Bird Migration.—Albert Wolfson. 1940. *Condor*, 42 : 93–99. Individuals of 4 subspecies of *Junco oreganus*, one resident and three migratory, were trapped at Berkeley, Calif. in two winters, kept in an outdoor cage and released May 23, 1938 and June 5, 1939. The migratory birds apparently left at once for the north, although the normal time of leaving is the last week of March; a number were retrapped the following winter. Only one of the migratory birds was seen a day after release; he was collected and found to have little stored fat in contrast to two of the three samples taken on June 7. Six wild resident Juncos and six migratory Juncos were collected from February 11 to March 25; "the migratory birds showed heavy fat and their testes averaged 1.5 mm. in length. The resident birds had testes 8.1 mm. long and no fat." p. 99.

The author points out that his results do not support the theories either of Rowan or Bissonette, and suggests that "the total physiological stimulus and physiological state of the bird is important in inducing its migratory and breeding behavior and not the physiological condition of one organ alone, such as the gonad." p. 98.

11. Gonads and Migration to Winter Quarters. (Keimdrusen und Wegzug.)—P. Putzig. 1939. *Ber. Ver. schles. Ornith.*, 24 : 36–41. Results of experiments on the American Crow (*Corvus brachyrynchos*) (Rowan, '32), Hooded Crow (*Corvus cornix*), Black-headed and Lesser Black-backed Gulls (*Larus ridibundus, L. fuscus*) (Putzig, *Vogelzug*, '37) show that the loss of testes has no influence on the migration to the winter quarters. Rooks (*Corvus frugilegus*) taken on the northward migration on the Kürische Nehrung in East Prussia may have testes ranging in size from 10–3000 cubic millimeters depending on age. Castrated Hooded Crows have migrated north, although held captive until after their fellows had gone. No rudiments of the testes were found in birds retaken. One Crow was exceedingly fat.

HOMING

12. Further Homing Experiments with Manx Shearwaters in 1939. My Island and Our Life There.—R. M. Lockley. 1939. *The Countryman*, 20 : 94–96 : 129–135. The two *Puffinus puffinus puffinus* that returned from Venice to Skokholm, Wales, nested again in 1939. Twelve more were shipped May 24 to Switzerland and released May 26: 3 at 5,380 feet near Berne in the Rhone Valley; one was back on its eggs June 8; 3 released at Lugano (watershed draining into the Adriatic); two were back 3 or 4 days after the bird from Berne; 3 were released near Andermatt at about 5,300 feet; two were found 2 days later in Switzerland. "It would seem that the Shearwaters, released among high mountains, amid ice and snow, far from the sea, made for the river valleys, then flew as direct as possible to Skokholm." Three birds released at the nearest point, near Basle, have not yet returned.

"It now seems that Shearwaters are not perturbed by and can fly through and above great land masses." "The experiment is not concluded; we may suppose that the birds travelled by the most direct route, 'on a compass course', no matter what obstacles were in the way."—J. J. Hickey.

13. The Orientation of the Digger-wasp (*Philantus triangulum*). (Ueber die Orientierung des Bienenwolfes (*Philantus triangulum* Fab.).) —N. Tinbergen and R. J. van der Linde. 1938. *Biol. Zentralbl.*, 58 : 427–435. There are two theories of homing: orientation by means of land marks, and homing capacity over unknown regions where "a positive taxis to the source of stimulation brings about the directed return." Honey bees were shown by Wolf (1926, 1927) incapable of directed return from an unknown region; the same proved true of the digger-wasps. Rüppell (1936, 1937) has shown that oriented return from unknown regions is possible for some birds, Schmid's (*Z. vergl. Physiol.* 23 : 592–604, 1936) experiments with wood mice (*Mus sylvaticus*) and dogs point to a similar conclusion. Lockley's experiments with Shearwaters and Griffin's with Leach's Petrels give further evidence of "absolute orientation."

WEIGHT

14. Variability in the Body Weight of the Brambling.—T. H. Shaw. 1939. *Bull. Fan Mem. Inst. Biol., Zool. Ser.* 9 : 241–250. *Fringilla montifringilla* is a regular migrant in Hopei Province, China; 250 specimens were weighed. The sex ratio was 119.3 males to 100 females. Weight ranged from 16 to 32 grams, averaging 21.96. Males averaged 22.71 grams, females 21.07. First year birds weigh less than adults. Monthly averages were: October 21.2 grams; November 20.9; December 23.1; March 23.2; April 23.6. As found by various American observers spring weight exceeded that in fall. Hourly records were taken on 6

birds for 4 days; the daily increase averaged 8.6%. There is a bibliography of 21 titles.

MOLT

15. The Molt of House Finches in the Pasadena Region, California.—Harold and Josephine Michener. 1940. *Condor*, 42 : 140–153. Another notable example from the Micheners of a well-planned and carefully executed project based on large scale banding. From 2,000–2,500 *Carpodacus mexicanus grinnelli* are banded at this station each year with vast numbers of repeat records. The molt starts with the loss of the first primary (proximal) and ends with the growth of the sixth secondary; it lasts 3½ months (105 days), extremes being 90 and 120 days. The adults have a complete postnuptial molt beginning from May 15 to mid August. "The postjuvenal molt of the early-hatched young was found to be the same as the postnuptial molt of the adults while the latest-hatched young shortened the molt period by beginning the molt soon after leaving the nest, by retaining all juvenal flight feathers, and by molting all the other tracts more nearly at the same time. Those hatched at intermediate times varied the time of beginning the molt relative to age, molted a varying number of the flight feathers, and compressed the molt of the other tracts proportionately to the time available between the date of hatching and early November." p. 152.

Besides detailed data on the molt of the House Finches, some observations are given on other species. "The late-hatched young of Song Sparrows, Mockingbirds, California Jays, California Towhees, and Spotted Towhees do not molt all the flight feathers, while the young of the earlier broods do. . . . On the other hand, immature Brewer Blackbirds and English Sparrows have never been observed to vary in any way from a complete postjuvenal molt." From observations on warblers in the spring and fall the authors conclude, "The molt must be for them much more rapid and at a more definite time than it is for the House Finches." p. 152.

LIFE HISTORY

16. Results from Banding White Storks in Pomerania. (Ueber die pommerschen Beringungsergebnisse beim Weissen Storch (*Ciconia ciconia* (L.).) —R. Stadie. 1939. *Dohrniana*, 18 : 18–31. In 1934 some 3,230 pairs of Storks nested in Pomerania. Nestlings are ringed in June and July; some are reported from South Africa by September! Others progress more slowly, for young birds may be found in Bulgaria in October. Some young storks return to Europe their second summer, but others stay in Africa even through their third year. They usually become sexually mature when 4 years old. Causes of mortality are chiefly shooting by natives in Africa, and striking high power wires in Germany. Some birds fail to migrate in the fall, and most of these perish from lack of food.

17. Changes in the White Stork Population since 1934. (Bewegungen im Bestand des Weissen Storches seit 1934.) E. Schüz. 1940. *Orn. Monatsb.* 48 : 1–14. A census of storks in Europe in 1934 gave 44,600 pairs; in 1936 Bouet estimated 62,000 pairs in French North Africa. A table is given showing the number of pairs from 1934 to 1939 in 19 localities—Switzerland (7–11 pairs), Holland and German provinces. The records for Oldenburg show an increased number of pairs that raised no young or one young (characteristic of first attempts at breeding) occurring 3 and 4 years after a successful breeding season when the average number reared per pair ranged between 2.5 and 2.8. Weather is one decisive factor in the success of nesting; cold weather at the time of laying is unfavorable; drought means a shortage of food and perhaps influences infestation by internal parasites.

18. The Stork in the Netherlands in 1939. (De Ooievaar (*Ciconia ciconia* (L.).) in Nederland in 1939.)—Fr. Haverschmidt. 1940. *Ardea*, 29 : 1–19. In 1929 there were 209 occupied nests, in 1934—274, in 1939—312. In 38 nests

no young were raised in 1939, in 140—3 young were raised and in 9—5 were raised; the average was 2.6 young per nest.

19. The Nesting of the White-tailed Kite in Southern Santa Cruz County, California.—A. C. Hawbecker. 1940. *Condor*, 42 : 106–11. Four nesting pairs of *Elanus leucurus majusculus* were found in connection with high populations of meadow mice. One pair nested twice. One pair tolerated other raptors, while the others did not. The latter were courageous in diving at human visitors "even after the young had left the nest and the second nest contained eggs."

20. Observations at the Nest of the Iceland Gyrfalcon. (Beobachtungen am Horst des Isländischen Jagdfalken.)—G. H. Sherlock. 1940. *Journ. f. Ornith.*, 88 : 136–138. Excellent pictures of the female and 3 young (18–19 days old) taken from a blind 4 meters from the nest. The male did all the hunting, bringing largely Ptarmigans; he came only 3 times during 15 hours of observation. The female was molting.

21. Studies on the Biology and Behavior of the Hazel Hen. (Untersuchungen zur Biologie und Ethologie des Hazelhuhns.)—H. Krätzig. 1939. *Ber. Ver. schles. Ornith.*, 24 : 1–25. Very interesting paper on the development of hand-raised *Tetrastes bonasia rupestris*. Sand baths were taken at one week. There was little fear until the age of 11 days when the alarm note appeared; at first they paid no attention to noises, but later were very sensitive. There were four main stages of development: first 11 days—needed brooding, reacted only to mother's alarm note, lively; at 12–15 days—flight acquired, and temperature control, roost in trees, fearful, slow movements; at 25–30 days—down disappeared, full juvenal plumage, increasing independence, change of voice; at 80–90 days—adult plumage, quarrelsome, breaking up of brother-and-sister flock, sex-differentiated notes, territory and formation of pairs. Tests were made with models of raptorial birds; the Sparrow Hawk (Accipiter) had the meaning of an air enemy to them, but a Buzzard (Buteo) and Swan did not. Experiments were made with bad-tasting insects; the young learned to avoid them after 4.5 days.

22. Studies on the Behavior of the Ptarmigan during Development. (Untersuchungen zur Lebensweise des Moorschneehuhns (*Lagopus l. lagopus*) während der Jugendentwicklung.)—H. Krätzig. 1940. *Journ. f. Ornith.*, 88 : 139–165. Another paper rich in valuable observations of which only a few can be mentioned here. At 32 days the down pattern of the head disappeared and at the same time the young became independent of parental care. Behavior of the 4 hand-raised young in taking food and water is described; the first sand bath was taken at 7 days. They were not fearful until the age of 20 days; they are less sensitive to sounds than other grouse. From 20 days on they crouched when a *Buteo*, Kite or Falcon flew over; at one month a Hobby (*Falco subbuteo*) was carried near them; the males went into the "attacking attitude", while the females were indifferent. At the age of one month the males took over the "warning" function; at two months they first showed territorial behavior. Experiments were made with models on reactions to their enemies; results were the same as with the Hazel Hens.

23. Observations on the European Coot. (Beobachtungen am Blässhuhn (*Fulica atra* (L.).)—P. Ruthke. 1939. *Orn. Monatsb.*, 47 : 141–147. Males come first, settle on territories and call for mates; both defend territories from other Coots. Some pairs are tolerant of Crested Grebes, Mallards and Pochards, others are not. Nest-building takes 4–12 days; is done by both sexes and continues after the eggs are laid. The male builds other nests and platforms for resting places for the young. Both birds incubate. The male takes the first hatched young and feeds them, sometimes bringing food to the nest. All come

to the nest at night where the female broods them. A 4-day-old orphan was given to a pair with somewhat older young and it was adopted. At one month the young begin to dive and get their own food. At 8 weeks they are independent; they join other young, but also return to their parents. Occasionally there are two broods; once young of the older brood helped feed the younger. They bathe in the manner of ducks.

24. Summer Life of the Sora Rail.—L. H. Walkinshaw. 1940. *Auk*, 57 : 153–168.—Much information on the nesting of *Porzana carolina* in Michigan, with weights of eggs, young and adults. Six to 13 eggs are laid, the average for 39 nests being 9.35; incubation lasts from 16–19 days. "Out of 36 nests, in which 266 eggs were laid, 177 young were brought off from 22 nests, giving a success percentage for nests of 61.11 and for eggs of 66.54."

25. On Some Experiments with Corncrakes.—A. G. Mason. 1940. *Irish Naturalists' Journal*, 7 : 226–237. *Crex crex* is polygamous and territorial; early in the season males paid more attention to a stuffed decoy, with which they tried to copulate, than they did to an imitation of the "craking", but later the opposite was true. Description of experiments, of various notes of the birds, and courtship display.

26. Social Nesting Habits of the Smooth-billed Ani.—David E. Davis. 1940. *Auk*, 57 : 179–218. Very interesting study made in Cuba of *Crotophaga ani*, a member of the Cuculidae. This species lives throughout the year in small flocks in which males predominate; each flock "possesses a definite territory which it defends against strangers." The birds "are very solicitous for other individuals of the flock, crowding around with great excitement when one member is hurt." They preen each other. It "is probable that there is a flexible order of social dominance." A communal nest is built and several females lay in it. "Often one bird, either male or female, is most interested in the nest, is most alarmed by the observer, and is most active in the building and incubation." p. 191. "The survival of the young is about 35%." The young remain with the flock for many months and "may breed with the parent flock." p. 181. Territorial advertisement and courtship display are simple, and the nesting cycle is easily disturbed. "The chasing, rushing, and fighting to defend the territory are very fierce. . . . Stuffed birds placed in the territory are attacked and destroyed", females fighting as vigorously as males. "The relationships between the adults are in some cases certainly monogamous, but in other cases, the relationships may be either polygynous or polyandrous." Older young assist in feeding subsequent broods. Colored leg-bands were used for the identification of individuals.

27. Great Reed Warbler and Cuckoo. (*Drosselrohrsänger und Kuckuck.*) B. Molnár. 1939. *Aquila*, 42–45 (1935–38): 257–264.—Along the Altwasser-Köros River in Hungary *Acrocephalus arundinaceus* is heavily parasitized by *Cuculus canorus*. Single female Cuckoos have territories 1.5–2 kilometers along the bank; they mate with several males. Yet other females also lay in these territories, nests being found with 2 and 3 Cuckoo eggs. A reddish female mated with a dark male in May, with a lighter bird in June and later with still another. Cuckoos hatch in 13–14 days, leave the nest after 3 weeks. In 1935 60–90% of the Reed Warblers raised Cuckoos. "The Cuckoo increases, the Reed Warbler decreases."

28. Inbreeding Barn Swallows. (Ratschläge zur Schwalbenberingung.) G. Creutz. 1938. *Vogelring*, 10(1) : 1–14.—Two cases of mothers mating with sons in *Hirundo rustica* in Germany.

29. Observations on Breeding and Song of Wren.—George Marples. 1940. *British Birds*, 33 : 294–303. The song of a male *Troglodytes t. troglodytes* lasted 4 seconds, and was usually followed by a pause of 6 seconds. The female did most

of the building, all of incubation and feeding of the 2 young, even driving off her mate when he came near. In 1937 T. D. Wier "watched a nest from 3 A.M. to 9.10 P.M. and records both sexes feeding 278 times in the day."

30. Observations on Nesting of the Chiffchaff. (Das Brutleben des Weidenlaubsängers).—O. Steinfatt. 1938. *Ber. Ver. schles. Orn.*, 23 : 20–27. Two all day observations on incubation in *Phylloscopus collybita* and three on feeding. At one nest on the 11th day of incubation (a sunny, warm day) the female incubated 70% of the daylight hours; she left 34 times, staying off from 1–17 minutes, averaging 8.2 minutes; her periods on lasted from 1–56 minutes, averaging 19.6. Another bird on the 3rd day of incubation (weather foggy, then sunny), incubated 85% of the day; she left 17 times, staying off from 2–25 minutes, averaging 8.2 minutes; her periods on ranged from 5–141 minutes, averaging 49.1.

The first nest was watched all day when the 4 young were 3 and 4 days old, and 8 and 9 days old; on the first day the female fed 99 times (6.2 times an hour), and on the second 228 times (13.4 times an hour); on the first day the first feeding came at 4.04, the last at 7.27; on the second at 3.36 and 7.06. Usually one insect was brought at a time. The male and female had practically the same foraging territory, but he troubled himself little about her and his offspring. One male had 2 mates with nests 25 meters apart. Incubation in one case lasted 15 days, fledging 13, 13 and 14 days.

There are usually two broods. In one nest two young died from a cold rain; the female fed the 11 day survivor as busily as she had all three; after a while it failed to swallow her offerings. She carried the food away, but in the next 3 minutes came back 5 or 6 times, touching the bill region of the young bird, but without result. She chipped constantly in this disturbing situation.

31. Observations on the Warblers in the Rominter Heide. (Beobachtungen über die Laubsänger in der Rominter Heide.)—O. Steinfatt. 1939. *Ber. Ver. schles. Orn.* 24 : 41–50. In the Wood Warbler (*Phylloscopus sibilatrix*) the female builds and incubates; both parents feed. Incubation lasts 14 days.

A nest of the Willow Warbler (*Ph. trochilus*) with 5 young was watched all day when the young were 5 and 8 days old. On the first day the male fed 94 times, the female 57, totalling 151 times in 15 hours and 57 minutes, while excreta were removed 32 times. On the second day the male fed 91 times, the female 117, totalling 208 times in 16 hours, 38 minutes; excreta were removed 37 times. The young left during the 11th day.

32. Incubation Behavior of Lanius ludovicianus in North Dakota.—A. Johnson. 1940. *Wilson Bull.*, 52 : 35–36. During 942 minutes of observation early in the incubation period, the female spent 81.3% of the time on the nest; her periods on ranged from 1–94 minutes, averaging 23; off from 0.5–28, averaging 5. The male fed her about once in 23 minutes; feeding was first observed 5 days before the laying of the first egg.

33. Starlings with Young at Christmas.—H. E. Forrest. 1940. *British Birds*, 33 : 314. A pair were watched feeding young in a hole in an ash tree in Shrewsbury at Christmas, 1939.

34. Breeding Behavior of the Black-throated Green Warbler.—F. A. Pitelka. 1940. *Wilson Bull.*, 52 : 1–18. Nest of *Dendroica virens* watched in Michigan. Nest building lasted 4 days, the male assisting on the first day, as was reported by Stanwood (*Auk*, 1910). Incubation was watched during one afternoon; the female was on 32 and 65 minutes, off for 12 and 13 minutes. When the two young were five days old, the nest was watched from dawn till dark; curiously enough they were fed 46 times, 18 by the male, 28 by the female, just as the 3 young of the same age watched by us in Massachusetts (Nice, *Bird-Banding* '32), although in our case only the female cared for the young. As with many other birds the male brought larger portions than did his mate. Charts are given show-

ing periods of attentiveness, etc. The birds were indifferent to a red squirrel, but chased off a Black and White Warbler. The parents displayed when the young left the nest, which they did at the age of 9 and 10 days. The male failed to feed the brood after this event, although they often do feed fully grown young.

35. Territorial Aspects of the American Redstart.—J. J. Hickey. 1940. *Auk*, 57 : 255–256. In a "heavily wooded slope in Westchester County, New York, the writer found *Setophaga ruticilla* to be a highly territorial species. Males advertised their presence by their typical well-known song and by formalized territorial displays that apparently served to define boundaries and reduce fighting. These displays consisted of short, horizontal, semi-circular flights made with stiffened wings and outspread tails. These performances were frequently observed between males, less commonly between females and never between a male and a female where a question solely of territory was involved. . . . As far as could be observed, these same performances seemed to serve as some part of the male's courtship of females."

In 1937 20 males were definitely mated, 4 apparently were not, although holding territory until late June. An "indeterminate number of unmated wandering males also exist." On June 13 "a male in the immature plumage spent the entire morning softly singing and gradually working its way along 800 yards at the top of the ridge. This bird was furiously driven off by males and females whenever it passed through their territories. Plumage notes on 48 males on territories showed that only four (8.3 per cent) were in immature plumage. All four were paired and possessed territories of the same size as those of the adult males." Territories were usually about an acre in size. "Males were silent in the presence of female Cowbirds, but females reacted with sharp hisses, a rapid snapping of the bill and much spreading of the tail." A great deal of significant information in few words.

36. Polygamy in the English Sparrow.—Theed Pearse. 1940. *Condor*, 42 : 124–125. A male *Passer domesticus* had two mates that were laying in the same nest; 4 eggs were considerably incubated, 2 were just started.

37. Nesting Habits of the Leucosticte.—Ruth Wheeler. 1940. *Condor*, 42 : 133–139. At a nest of the Sierra Nevada Rosy Finch (*Leucosticte tephrocotis dawsoni*) in the Yosemite the female incubated and brooded; both parents brought large amounts of food about once in 45 minutes; this was gathered in meadows far below the nest.

38. A Contribution to the Biology of the Lapponian Bunting (*Calcarius lapponicus* L.).—A. V. Mikheev. 1939. *Zoological Journal, Academy of Sciences of U. S. S. R.*, 18 (5) : 924–938. Russian with English summary. Male Lapland Buntings arrive on their breeding grounds before the females in the Timan tundra on the River Velt, the first of the males appearing May 8, of the females May 13. Each male guards his territory against other species as well as against other Longspurs. The size of the territory averaged 0.01 km. Nest building began May 31; 4–6 eggs were laid. The female incubates, both parents feed the young, gathering insect food within the limits of the territory. Fledging lasts 8–10 days. Young leave the nests in greatest numbers in early July; they start to molt between the end of July and early August; by September the first winter plumage is complete and indistinguishable from adult winter plumage.—F. A. Pitelka.

BIRD BEHAVIOR

39. Pair Formation in the Raven. (Die Paarbildung beim Kolkraben.)—K. Lorenz. 1940. *Zeitschrift für Tierpsychologie*, 3 : 278–292. A discussion of different types of mating in birds. The impressive behavior of a tame male Raven (*Corvus corax*) towards the female is described and illustrated with photographs. This female had been previously so intimidated by the male, that she

appeared unable to carry out her part in the ceremonies and flew away. Lorenz had also two young Ravens which had behaved like a pair, but upon the disappearance of the older female, the "male" of the "pair" became the mate of the old male.

40. Observations on Captive Robins.—David Lack. 1940. *British Birds*, 33 : 262–270. In late February two known pairs of *Erithacus rubecula melophilus* were put in an aviary 30 x 20 x 6 feet, and one known pair and an unmated male and female were put in an aviary 30 x 12 x 6 feet. The dominant pair in each aviary bred, but the others did not. The minimum territory of a wild pair is 2000 square yards; the aviaries offered 40 and 67 square yards. The ownership changed once in one aviary and twice in the other. Territorial and aggressive behavior was modified, but the breeding behavior of the dominant pair was nearly normal. It is clear that "possession of territory is psychologically essential for nesting"; subordinate pairs showed almost "no traces of breeding behaviour." In aviary 2 the dominant male nested with both females; no young were raised, but his first mate built again and raised young. At the age of 17 days, young birds first picked up food for themselves, but they were fed by the parents until they were 32 days old.

The relationship of song and the thyroid gland is discussed. Küchler (1935) found a spring and autumn peak of activity in the thyroid in the Redbreast and the Yellow Hammer (*Emberiza citrinella*); both of these species sing in the fall. Besides the Redbreasts there were two pairs of Chaffinches (*Fringilla coelebs*) in aviary 1; the dominant pair bred, while the others "showed no traces of breeding behaviour."

41. Antipathy in the Screech Owl.—Leon Kelso. 1940. *Auk*, 57: 252–253. Hand-raised Screech-Owls (*Otus asio naevius*) taken from the nest before their eyes were open, showed "extreme anxiety", "then flight or fight" when the skin of a Crow was shown them at the age of 2 months. The black color and slight movement were found to be essential characteristics for releasing the aversion. The birds were unresponsive to stuffed skins of "the Goshawk, Barred and Horned Owls."

42. Courtship Feeding in Birds.—David Lack. 1940. *Auk*, 57 : 169–178. "In many different groups of birds the male feeds the female during courtship or incubation." Occasionally as in Terns "either sex may beg for or present food", while in the "Button Quail, *Turnix*, the normal procedure is reversed and and the female feeds the male. This was perhaps to be expected, since in *Turnix* nearly all the sex behavior is reversed." The significance of the habit is discussed, its symbolic nature and finally its occurrence throughout the class Aves, with a classified list of its occurrence or absence in the different orders and families, with a request for further observations.

43. The Releaser Concept of Bird Behaviour.—David Lack. 1940. *Nature*, 145: 107. "Lorenz has provided a wealth of data and analysis to show that many instinctive acts in birds are 'released' not by the external situation as a whole, but by some characteristic part of it. This greatly assists in explaining the evolution of plumage patterns and rhythmical movements in display in birds, particularly with regard to their 'improbable' and specific nature." On the basis of his experience with Redbreasts, Lack suggests that "releasers are not the fundamental units of bird behaviour. Rather, the bird reacts originally to a more general situation. At a later stage (later in evolution if the releasing complex is inherited, later in the life of the individual if it is acquired; this issue is not discussed here), the bird tends to react primarily (but not necessarily exclusively) to a characteristic part of the external situation."

It seems to the reviewer that many more observations and experiments are needed to throw light on this problem.

44. On "Taking Offense" in Birds.—(Ueber "Anstoss-Nehmen" bei Vögeln.) F. Goethe. 1940. *Zeitshrift für Tierpsychologie*, 3 : 371–374. Many instances have been recorded of birds taking offense at individuals that appear abnormal, for instance in storks, geese and cranes. Gulls and terns marked with red were attacked by others, and the same was true of injured individuals. Young Herring Gulls and Swifts that are not well able to fly are attacked by adults. Cranes and Jackdaws attack the dominant of two fighters. Ravens and Hooded Crows attack a predator that has caught one of their fellows, then attack the injured bird! This dislike of unusual appearance and behavior in a fellow-member of the species is characteristic not only of birds but of mammals, including ourselves.

45. Breeding Behavior of the Squid. (Zur Fortpflanzungsbiologie von *Sepia officinalis* L.).—L. Tinbergen. 1939. *Arch. Neerland. Zool.*, 3 : 324–364. A detailed study illustrated with sketches and photographs. A male in breeding condition displays before another squid; if this is a male in breeding condition it answers with a like display; if it does not display, nor flee, a pair is formed. This is fundamentally the same picture we find in the breeding behavior of many birds. It is not only valuable to compare the behavior of other animals with that of birds, but some other animals lend themselves more readily to experiment than do birds.

46-48. "Counting" in Birds. Concluding Experiments on the Question of "Counting" Ability in Domestic Pigeons. (Abschliessende Versuche zur Frage des "Zähl"-vermögens der Haustaube.) W. Arndt. 1939. *Z. d. Tierpsychologie*, 3 : 88–142. The learning of Abstract Numbers by the Jackdaw. (Vom Erlernen unbenannter Anzahlen bei Dohlen.) K. Schiemann. 1940. *Ibid*, 3 : 292–347. Experiments with Shell Parakeets on the Problem of "Counting" Ability. (Versuche an Wellensittichen zur Frage des "Zähl" vermögens.) E. Marold. 1939. *Ibid.*, 3 : 170–223.—Since 1935 O. Koehler and his students have published a number of papers on the ability of birds to "count". Their experiments are based on training to situations in which we would orient ourselves by counting. In general this training is done with food and punishment (fright). The most important experiments can be divided into two groups:

1. Choice between two quantities of objects. By changing the number of objects (grains, peas) it is possible to find the limits to which discrimination is possible for each bird. A maximum of 5–6 was found.

2. Taking of a certain number of objects (and not more or less) from one or more quantities under certain circumstances. A maximum of 6 was found.

In the past one great difficulty has been the involuntary influence of the experimentor on his subjects which invalidated experiments that seemed to show that animals may be excellent mathematicians, for instance, *Der Kluge Hans*. Moreover, the sequence of the experiments is not without influence on the results.

Arndt's paper seems to be intended as a final account of the experiments with domestic pigeons; we now have the results of training with 12 individuals. Marold performed similar experiments with 6 Parakeets and comes to almost the same conclusions. Schiemann is the first to work with tame individuals of a wild species; his 10 Jackdaws were trained in opening food boxes with numbers of dots on the cover. They learned much faster then the pigeons and parakeets.

These and other observations seem to prove that birds in experiments act as if they were able to count visual or auditory impressions. There are a few confirmatory records under natural circumstances. Similar observations have been made on mammals (monkeys). But what we know about the development of counting in children and people living under primitive conditions does not make it probable that birds really count in the way that adult and civilised people do. An exact and "scientific" counting is based on a series of words or symbols, and is thus linked with our powers of speech and writing. As long as the contrary is not proved, we have to explain the observations on "counting" by birds by assuming substitute processes, which may replace counting, also in man. These sub-

stitutes are: *a*, distinguishing between two quantities offered either simultaneously or in succession; *b*, observation and memory of the location of one or more special objects in a quantity of objects; *c*, memory of a certain "rhythm of actions" (Bierens de Haan, 1935, *Zool. Jahrb.*, 54 : 249–404) or "action up to a certain number" (Koehler).

The experiments show a great difference between individuals of the same species in their ability to "count." This is not surprising in domestic animals, that show much physical diversity. Observations with more uniform wild forms would presumably be worthwhile. The variation in ability to learn counting is greatly effected by "temperamental differences" which make the birds more or less suitable for this kind of experiments.—JOOST TER PELKWYK.

SEX AND AGE RATIOS

49. Sex and Age Ratios in Survival of the Californian Quail.—John T. Emlen, Jr. 1940. *Journ. Wildlife Management*, 4 : 92–99. Records on 17,632 *Lophortyx californica*. The sex ratio averaged 112.2 males per 100 females. In early fall there were 105 males to 100 females, in winter 112 males and in late spring 127 males. Age ratios start with 200 immatures to 100 adults in the fall and change to 100: 100 in late spring. Survival from "potential egg" to 1 year is calculated as 8.5%; from 6–18 months 31%; over 12 months 50%. "It is suggested that in localities where high ratios indicate low annual replacement, attention of game managers should be directed to the winter environment. In the reverse situation summer factors should receive primary attention." Fifty per cent seems a low survival rate for this bird; it would mean an average life of two years for those reaching adulthood (*Trans. Linnaean Soc. N. Y.* No. 4, 1937. pp. 190–198).

ECOLOGY AND POPULATION STUDIES

50. The Bird Population of an Oxfordshire Farm.—W. M. M. Chapman. 1939. *Journ. Animal Ecology*, 8 : 286–299. Winter censuses for 10 years (86 counts) on 125 acres resulted in 3.6–5 birds per acre on pasture (2.7 miles of hedge per 100 acres), and from 3.7–7 birds per acre on arable land. Summer censuses on 300 acres on the same farm taken 1931–34 gave two birds an acre.

51. An 8-Year Census of Lesser Prairie Chickens.—V. E. Davison. 1940. *Journ. Wildlife Management*, 4 : 55–62. On an area four miles square in western Oklahoma *Tympanuchus pallidicinctus* is rigidly protected, yet the birds range outside where they are shot. The cocks were counted on their "gobbling grounds", where they come every morning from late February to early June. The number of birds on each lek is constant; cocks banded on the right or left leg showed that "each male takes the same position relative to other birds on a given gobbling ground throughout the season." Sex ratios in coveys of young birds during 3 years ranged from 140 to 163 males per 100 females. The number of gobbling grounds ranged from 18–40 during 7 years, while the number of cocks from 1932–39 (1937 omitted) were as follows: 490, 606, 353, 360, 289, 266, 352. The author warns against optimistic "estimates" of Prairie Chicken populations; the Oklahoma Game and Fish Department stated that there were 5,000 Chickens on the Davison Ranch, when in reality there were less than 1,500. "Prairie Chickens of all species are so low in number that publicizing figures in excess of actuality is a menace to conservation of the birds."

52. Range, Population, and Game Status of the Western White-winged Dove in Arizona.—J. A. Neff. 1940. *Journ. Wildlife Management*, 4 : 117–127. The fact that *Melopelia asiatica mearnsi* gathers in large flocks that concentrate about water or food supplies, makes it exceedingly vulnerable to shooting. From 65 to 85 per cent of such a flock may be killed. Due to drought and intensive shooting this bird is "in very serious condition."

53. The Food and Habits of the American Merganser during the Winter in Michigan, Considered in Relation to Fish Management.—J. C. Salyer, II, and K. F. Lagler. 1940. *Journ. Wildlife Management*, 4 : 186–219. *Mergus merganser americanus* eats from ⅛ to ½ its weight daily in two meals. Where these birds concentrate on trout streams they can be frightened off by "Merganser drives" and can be kept from hatching ponds by mechanically exclusory or frightening devices.

54. The Effect of Certain Land Use Practices on Populations of Breeding Birds in Southwestern Ohio.—C. A. Dambach and E. E. Good. *Journ. Wildlife Management*, 4 : 63–76. Markedly larger populations were found when farms were replanned for soil conservation. The average number of pairs per 100 acres on large meadows was 48; on meadows strip-cropped 93; on small grains not strip-cropped 10, on small grains in strips 27; in grazed woods 111, in protected woods 225. An encouraging outlook.

55. Original and Present Breeding Ranges of Certain Game Birds in the United States.—R. C. McClanahan. 1940. Bur. Biol. Surv. Wildlife Leaflet BS 158. Washington, D. C. 21 pp. An illuminating series of maps. The decrease in the breeding ranges of the Trumpeter Swan, of ducks and geese, grouse, the Sandhill Crane, Woodcock and others is appalling. A few species have invaded new regions, either of their own accord—Prairie Chicken and Ring-necked Duck, or through introduction by man—Bobwhite and California Quail. The Ruffed Grouse is shown as having originally nested in northeastern Oklahoma; although this seems probable, I was not able to find a single record of the occurrence of this species in the state. The map of the Lesser Prairie Chicken extends its present range too far to the east in Oklahoma. On the map of the Bobwhite the present range is not given at all except where it has been introduced; presumably it is fairly coincident with the former range, although its numbers in many places are greatly reduced. The Mourning Dove has the proud distinction of a country-wide distribution both in the past and present. A most interesting pamphlet, well worth careful study.

BOOKS

56. The Status and Distribution of Wild Geese and Wild Duck in Scotland.—International Wildlife Inquiry, II. John Berry. 1940. Cambridge University Press. Macmillan. N. Y. 190 pp. $3.25. A most valuable inquiry into the numbers of waterfowl. The book gives a Summary of the status of Wildfowl in each faunal area (there are 12 of these shown on a large map), then reports on each species of geese and ducks with general discussions, bibliography and index. The picture is a disturbing one:—incredibly long shooting seasons—from August through February,— accessibility of former wild haunts through the motor car; shooting over decoys; excessive shooting; increase of enemies, such as crows, gulls, pike and Mute Swans; drainage and aforestation; the break up of estates which had formerly served as virtual sanctuaries. There are many items of great interest. Canada Geese were introduced 200 years ago and breed in the wild in some districts. "Although the migratory habit has been largely lost, the geese gather into flocks in autumn and move down to winter in definite districts as do the home-bred Greylag. These naturalized Canada Geese are extremely wary, and as hard to shoot as any other species." p. 53. Some ducks have greatly increased their ranges—Goosander, Red-breasted Merganser, Tufted Duck and Pochard. The killing of Goosanders and Mergansers removes the chief enemies of the pike; the pike eat each other, "migrating salmon smolts and parr" and young ducks. "For the conservation of the salmon, as well as for that of the wildfowl, the writer considers that in such circumstances the *Merginae* may do materially more good than harm." p. 164.

Modern inventions have "reduced the numbers of wildfowl from hundreds, or thousands, of millions to figures which come perilously near to being countable."

p. v. Few suggestions are given as to the protection of the waterfowl. To an American there are two that are obvious: sanctuaries, and drastic curtailment of the open season, particularly the abolition of spring shooting.

57. Bird Reserves.—E. C. Arnold. 1940. With 9 coloured plates from paintings by the author. Witherby. London. 215 pp. 15/. An enthusiastic account of the author's purchase of a pond; his labors to increase its attractiveness and of the satisfaction he gained thereby. An annotated list is given of the 106 visitors to the "Mere", all written in entertaining, informal style. We may heartily agree with the author when he writes, "For to my mind bird protection is nowadays far more a matter of preserving bird haunts than of making laws to protect birds, which may easily, like the Kentish plover, be exterminated by progress in the form of bungalows, though officially protected by the law."

58. Bill and the Bird Bander.—Edna H. Evans. 1939. John C. Winston Co. Phila. 220 pp. $1.50. A lively book on banding, a surprising amount of sound information being given in entertaining form through the situation of an eager boy helping the "Professor" band pelicans, skimmers, terns, and many other birds in Florida. The book is illustrated with 76 photographs and is provided with an index. An excellent book for boys and girls.

59. Texas Bird Adventures.—Herbert Brandt. 1940. Bird Research Foundation. Cleveland, Ohio. 192 pp. $3.00. An enthusiastic account of a collecting trip to the Chisos Mountains and to a great cattle ranch south of the Red River. Much of the narrative is interesting, but when the author tries "fine writing" he is not so successful. Two notable birds, the Scissortail Flycatcher and Mississippi Kite receive special tributes. There are a number of excellent sketches by George Sutton. According to the advertisement this book "will be welcomed by bird lovers everywhere." I wonder. It is my experience that "bird lovers" prefer to read "intimate studies" where the birds are not robbed of their eggs.

60. The Great Naturalists Explore South America.—Paul R. Cutright. 1940. Macmillan. N. Y. 340 pp. $3.50. Part One of this book gives a brief account of the Great Naturalists; Part Two is a compilation from their works on different animals—mammals, birds, reptiles, insects. The author has shown much industry in gathering into various chapters incidents from many writers, but he is not always as critical as he should have been, either in his choice of authorities or in his own conclusions. For instance, on p. 168 he makes two erroneous statements as to migration of birds. "It is well known that birds are very regular in their migratory travels: they generally leave a given region on a definite date and return on a day which can be specified." "Light may be a very important factor in the migration of birds; however, biologists agree that these flights are initiated each year through the activity of the sexual glands." It is strange that such a book should have been written by a man who has not himself been in South America.

61. Romance of the National Parks.—James Harlean. 1939. Macmillan. N. Y. 240 pp. $3.00. This handsome book treats first of the "History" of the older parks—Yellowstone and Yosemite and of the heroic labors of John Muir; and second of "Journeys", describing briefly "Magnificent Mountains of the Northwest", "The Pioneer Western Parks", "The Old Southwest" and "East of the Mississippi." It is a tragic story: heart breaking efforts of devoted men with a passion for unspoiled nature and vision for the future, largely frustrated by indifference and greed. We have a few magnificent areas supposedly preserved for posterity, yet even these have been made too accessible to throngs of sightseers, and none are safe from attacks by predatory interests. The quotations of the noble words of John Muir constitute one of the best features of the book. Most of the 123 photographs show us the grandeur of nature; it seems a pity to

have included views of hotels and cabins. There is an index, but no mention of where one should write to get free information on the parks. A strong plea is made for "many more wilderness areas."

This is an admirable book, beautifully illustrated, a testimonial to the unselfish endeavors of those who have labored to save some places in nature from exploitation, and a warning lest we lose even these.

62. The Birds of Buckeye Lake, Ohio. (Misc. Publ. Museum of Zoology, University of Michigan, No. 44.)—Milton B. Trautman. May 7, 1940. 466 pp. Frontispiece and 15 plates. 2 Maps. $2.50.

This very detailed and extended report covers a region of approximately 44 square miles centered about Buckeye Lake in east central Ohio. The field work and observations covered a period of twelve years from February 1, 1922 to February 1, 1934 and were conducted chiefly by the author with assistance from various organizations and individuals. By means of the published accounts of early travels the original primitive conditions of the area are deduced; from published sources and recollections of the older inhabitant, the rapid changes that took place between 1821 and 1890, coincident with the settling of the area and advances of agriculture are described. Further advances and "improvements" between 1891 and 1920, and from 1921 to 1934 are likewise traced. Some space is devoted to discussion, the changes in the status of various groups and individual species of birds as they were affected by the general changes in the area during "historic times" (*i.e.*, since 1751). Additional subjects covered include localities and conditions between 1922 and 1934, climatic conditions, wintering birds, nesting and summering birds, ecology of birds in the swamp lowlands, distribution and relative abundance of birds throughout the year, sources of data, etc.

The 288 forms of birds recorded from the area are discussed in considerable detail; the status of each is given, earliest and latest recorded dates of arrival and departure, median arrival and departure dates, and much interesting and valuable information on habits, life history, food, changes of status and seasonal fluctuation.

This is probably the most ambitious and comprehensive survey of the bird life of a limited area that has yet been undertaken in this country. The quantity and quality of the field notes and the many sides of the investigation attest to Mr. Trautman's industry and his close attention to detail. From the very beginning of the study he appears to have had a definite final objective in view; this objective he has now attained in a most creditable manner. The Birds of Buckeye Lake should stand as a model to anyone attempting a similar piece of work.—J. L. P.

ANNOUNCEMENTS

THE HERON SURVEY

During 1940 color banding of colonial birds will stress a new object—herons (chiefly night herons, plus a few green) instead of herring gulls. Modelled on the Gull Survey—though on a much smaller scale as yet—a Heron Survey will cover several rookeries. Ultimate results will depend on the feasibility of sight returns and the co-operation of individual observers. Returns should follow a natural pattern. The following table is intended to show all uses of color bands on any herons in the United States. It is hoped that notes on omissions, plus all reports of birds seen, will be sent to the Heron Survey, New England Museum of Natural History, 234 Berkeley Street, Boston, Mass.

1937–38: New York City region (Allen and Mangels): 2 colored bands on each leg (plus a Survey band).
1939: Waltham, Mass.: red on right leg, Survey on left; Perugue, Mo., black on right, Survey on left; Davis Co., Utah (Woodbury), red over Survey on right, yellow on left.
1940: All rookeries will have blue on right, and, on left: Waltham, Survey over red; Perugue, Survey over black; Marshfield, Mass., Survey over blue; Tyngsboro, Mass., Survey over yellow; Newport, R. I., Survey over white.

BIRD-BANDING wishes to be of the greatest possible assistance to all banders, and feels that in publishing notes on particularly successful technique it is furthering this idea of greatest service. To this end all banders are urged to send in brief notes of methods that they may have developed that are producing good results, especially on "hard to catch" species. Such notes may deal with baits, trap improvements and various other refinements and improvements of technique.

INFORMATION WANTED ON INCUBATION PERIODS

A serious gap in our knowledge of bird life in this country lies in the absence of definite information on nesting. Some of the chief points we need to know on even our commonest species are *accurate records* on: share of the sexes in building, in incubation, length of incubation period, share of the sexes in care of the young, length of time young stay in the nest, age when young become independent.

As to length in incubation, this should be counted from the laying of the last egg to the hatching of the last egg, in case all hatch; or from the laying to the hatching of marked eggs. (Eggs can be marked as laid with India ink and a grass stalk as a pen.)

Much information on these points was published in the journal *British Birds* by observers who sent in summaries on a number of

species, a method that gave a maximum of information in a minimum of space.

I hope that readers who have *definite* records on the above points will summarize them and send them in to *Bird-Banding*.—Margaret M. Nice, Chicago, Illinois.

THE SOCIETY FOR THE STUDY OF SPECIATION

A society of individuals interested in various aspects of the dynamics of the origin of species is in the process of being organized. The members include Botanists, Zoologists, Bacteriologists and Anthropologists from the fields of Cytology, Genetics, Ecology, Paleontology, Physical Anthropology, Comparative Psychology, Taxonomy, Physiology, Embryology and the Biology of Populations.

It is not desired that one more formal organization be added to the large number of societies already in existence, but the need is felt for an informal cooperative group of scientists willing to pass information from one to the other. It is proposed that a rather informal information service be instituted through the publication of a booklet to contain recent bibilographies, information from the various laboratories and critical discussion of recent phases of the study of speciation. The dynamics of the origin of races and subspecies is included as a center of interest as well as the origin of higher categories which contribute to our knowledge of the origin of species.

No dues are contemplated at the present time during the period of organization, but a modest amount will probably be contributed by the members when the need and value of such an organization is manifest. The cost of organization and the first booklets is being defrayed through an anonymous grant.

The following men have agreed to act as an executive committee for the receipt of funds and the determination of policy: Edgar Anderson, John M. Beal, William Burrows, L. J. Cole, L. R. Dice, Th. Dobzhansky, Alfred Emerson (Secretary), A. C. Kinsey, W. M. Krogman, Raymond Pearl, Karl P. Schmidt, George G. Simpson, and Sewall Wright.

About 250 members have already joined the Society. Those interested are asked to communicate with the secretary.

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